

VERITAS UNIVERSITY, ABUJA  
(The Catholic University of Nigeria)  
Obehie Campus, Abia State



DEPARTMENT OF BIOLOGICAL SCIENCES  
COLLEGE OF NATURAL AND APPLIED SCIENCES

PROSPECTUS

**of**

**UNDERGRADUATE PROGRAMMES**

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## **FOREWARD**

The Department of Biological Sciences is one of the four Departments that make up the College of Natural and Applied Sciences of VERITAS UNIVERSITY (The Catholic University of Nigeria), ABUJA. The Department had initial approval to run three programmes, B. Sc. Applied Microbiology, B. Sc. Plant Science and Biotechnology, and B. Sc. Marine Biology and Fisheries, but only B. Sc. Applied Microbiology is currently running due to lack of students in the other programmes.

The Department of Biological Sciences started with initial student enrolment of 20 and 2 academic staff, but along the line 4 students withdrew. In the third year enrolment had risen to 29 students with academic staff strength of 5. Today we have 1 Associate Professor, 1 Lecturer I, 2 lecturer II, and a Senior Technologist (Microbiology). The Department has modern and standard laboratory facilities that could enable it run programmes in both Biology and Microbiology.

The Department is engaged in teaching and research work for the institution and the public at large.

The establishment of the department is most appropriate and beneficial to the National Economy especially as this happened at the period when the nation is striving toward improving educational standard and technological self-reliance. So this development would go a long way in assisting the states of the federation in meeting their quota in the technological sector of the national economy.

**DR. OKOI ENANG EFFIOM**

Ag HEAD OF DEPARTMENT  
DEPARTMENT OF BIOLOGICAL SCIENCES

## 1.0 VISION OF THE DEPARTMENT

In line with the vision of Veritas University and the College of Natural and Applied Sciences, the Department also seeks to create and maintain an academic environment based on modern science and technology.

## 2.0 MISSION OF THE DEPARTMENT

To produce scientists who are abreast with the current methodologies in science and technology to enable them compete favourably with their contemporaries all over the world.

## 3.0 STAFF

### A. Pioneer staff

#### Dr. Bryan O. Ogeneh:

- i. B. Sc. Microbiology (UNN), M. Sc. Microbiology (New Zealand), Dip. Com. Health (New Zealand), Ph. D (ESUT), Certificate in Immun. Tech. (New Zealand). **Ag Dean, College of Natural and Applied Sciences.**
- ii. **Dr. Bernard Matur:**

B. Sc. Zoology (Jos), M. Sc. Applied Parasitology and Entomology (Jos), Ph. D Applied Parasitology (ABJ).

**Ag. Dean of Student Affairs /HOD, Biological Sciences 2008/2009**

### B. Current staff list

#### I. Dr. Okoi Enang Effiom

HND (POLYCAL) Applied BioLogy, PGD (UNICAL) Medical Microbiology and Parasitology, M. Sc (UNICAL) Medical Microbiology and Parasitology, Ph. D Parasitology (MICHAEL OKPARA, UMUDIKE).  
**(Ag. HOD, Biological sciences).**

#### II. Dr. Uchenna Mchael Orji

BSc (Hons) Microbiology, Uniport. PGD Business Administration, Unizik. MSc Food Microbiology, Unizik. PhD, Environmental Microbiology,

Unizik.

**III. Dr. Rwang Pam Gyang**

BSc (Hons) Zoology, Unijos. MSc Applied Entomology & Parasitology, Unijos. PhD Applied Parasitology, ATBU.

**IV. Mr. Bede Chike Anyaegbunam,**

B. Sc. (UNIZIK) Applied Microbiology, M. Sc (UNIZIK) Food and Industrial Microbiology.

**V. Miss Evangeline Ukachi Eleanya**

M. Sc. (RSUST) Med. Microbiology, PGD (RSUST) Chemical Engineering, AIMLT PGD (UNIPORT) Chem.Pathology, B.Sc. (UNN) Microbiology/Chemistry.

**VI. Miss Theresa Obiageli**

M.Sc.(UNIPORT) Environmental Microbiology & Bioremediation, B.Sc. (UNICAL) Microbiology

**VII. M.Sc. (UNIPORT) Environmental Microbiology & Bioremediation, B.Sc. (Onabanjo University) Microbiology.**

**VI. Mr. Eugene E. Itam (Technologist)**

PGSD (NIST), MIST (NIST), AIST (NIST), FDLT (Ibadan).

#### **4.0 Programmes offered**

The Department of Biological Sciences offers only one programme for now, i.e.

**B. Sc. Hons. Applied Microbiology**

#### **5.0 BRIEF HISTORY OF THE DEPARTMENT**

The Department of Biological Sciences was one of the pioneer departments in the University and in the College of Natural Sciences which was created in the 2007/2008 academic session but commenced academic activities during the 2008/2009 academic session with 20 students for the Bachelor's Degree programme.

## Pioneer Students of Department of Biological Sciences

S/N	Matriculation Number	NAME	GEN
1	VUG/BIO/08/001	ANOKA Chiwendu Lucia	F
2	VUG/BIO/08/004	Nwachukwu Aloysius	M
3	VUG/BIO/08/005	NWAMADI Mabel Ngozi	F
4	VUG/BIO/08/006	OKEKE Chinonso Florence	F
5	VUG/BIO/08/013	DEHINBO Olajimoke	F
6	VUG/BIO/08/014	UBUARA-FRANK Okiemute	F
7	VUG/BIO/08/017	NWAZUO Adaugo C	F
8	VUG/BIO/08/018	OKORIE Ijeoma Pelagie	F
9	VUG/BIO/08/019	ONWULI Moses Chiwendu	M
10	VUG/BIO/08/020	EKWUEME Martins Uchendu	M
11	VUG/BIO/08/034	MADUAGWU Chinedu Emmanuel	M
12	VUG/BIO/08/049	SELEKERE Doubra Agatha	F
13	VUG/BIO/08/052	MADUEKWE Mildred	F
14	VUG/BIO/08/059	UKAH Sylverine U	F
15	VUG/BIO/08/069	ILOABUCHI Ugochukwu	M
16	VUG/BIO/08/070	ETTA Victor Ebuta	M
17	VUG/BIO/08/075	FAKOREDE Bisola Esther	F
18	VUG/BIO/08/076	AKATTA Elooghere Zino	F
19	VUG/BIO/08/077	EZEMEGBU Nonso Louis	M
20	VUG/BIO/08/078	EMURUTU Okiemute	F

The Department of Biological Sciences offers courses to students leading to the award of the B. Sc Degree in Applied Microbiology.

The Bachelors Degree in this Department is not only a specialist programme in the traditional sense, but it is also programmed to be as relevant to the Nation's needs as possible. The programme is based on the National Universities Commission (NUC) approved standard (1990) for all Nigeria Universities.

### 6.0 PHILOSOPHY

Science and Technology has in the past few decades played very vital role in the transformation of some global once rural economies to great economic powers as seen in countries like Singapore, Malaysia, Taiwan, Brazil, China, South Korea, etc.

The Department of Biological Sciences seeks therefore to educate and train men and women as the vanguards of a scientific and technological revolution that will make Nigeria one of the top twenty countries in the world come 2020. We are focused and our emphasis is not only on theory but also on practical aspects of Science.

## **7.0 OBJECTIVES**

In line with the stated philosophy, the Department since its inception in 2008 has been deeply involved in teaching practical and relevant Biological Science courses in order to produce relevant and skilled manpower for the country's needs and the society at large.

The programme therefore, aims at producing graduates who will be useful in the following areas of the country's needs:

1. Secondary and Tertiary Institutions
2. Research Institutions and Universities
3. Hospitals, Agricultural and Forestry Establishments
4. Ministries, Oil Companies and Foreign Services
5. Libraries (Science Reference Librarians) etc.

## **8.0 ENTRY QUALIFICATIONS INTO B. Sc (HONS) BIOLOGICAL SCIENCES DEGREES:**

Students for the Bachelors degree may be admitted either by

- i. Passing the Universities Matriculation Examination (UTME) after having obtained the Senior Secondary School Certificate with five credits which must include Biology, Chemistry and Mathematics or GCE 'O' Level credits in five subjects with a similar proviso. A credit level in SSCE English Language, or GCE 'O' Level English Language will be required and at least a pass in Physics may be mandatory together with credits in five other subjects including the science subjects listed above. Selection of candidates is done by the Joint Admission and Matriculation Board (JAMB).



- ii. Admission to the Bachelor's programme may be by direct entry to the three year standard programme upon obtaining 'O' Level SSCE or GCE with credits in four subjects including Biology, Chemistry and Mathematics in addition to 'A/L' GCE passes in Zoology (or Biology) and Chemistry. An A Level pass in Chemistry or Mathematics will be an advantage but A Level pass in Biology is mandatory. Candidates are selected by JAMB.

## **9.0 REGISTRATION:**

### **9.1 GENERAL**

**All new students, on arrival at the University, should proceed for registration as follows:-**

- i. See College Officer – for screening, clearance and course registration forms
- ii. See Academic Officer – to collect registration files and forms and to have them signed
- iii. Bursary (Students) – to pay all necessary accommodation fees
- iv. See Student Affairs Officer – for hostel allocation
- v. See the University Librarian – for library registration
- vi. See the Officer in-charge of the University Medical Centre – for registration and medical examination
- vii. See Head of Department – for Departmental registration/documentation.

### **9.2 Course Registration**

At the beginning of every semester, all students are required to follow the procedures prescribed by the Examination and Records Unit of the Registry, and register manually and on-line.

A student is not fully registered for an academic session unless and until these manual and on-line procedures have been completed within a prescribed period.

A student who registers late shall pay a late registration fee to be determined from time to time by the University.

At the beginning of every semester, all students are required to register for the approved appropriate level of courses.

Any student who fails to register within two months of the beginning of the semester shall not be allowed to register for that semester any more. For the candidate admitted to 100-level of study, or through Direct Entry, his/her admission shall be considered to have lapsed. Any returning student who fails to register within two months of the beginning of the new session shall be deemed to have voluntarily withdrawn from the University. In addition, such a student shall be re-admitted in a subsequent session only with the approval of Senate.

### **9.3 Late Course Registration**

A student who fails to register and submit her/his manual course registration form within two weeks of the official resumption for each semester shall pay a late registration fee to be determined by the University. Failure to register and submit the said course registration form within one month of resumption attracts a higher late registration fee to be determined by the University from time to time.

Students who attend lectures in courses that they have not registered for shall do so only with the express permission of the course lecturer(s). However, such students shall not earn any credit units from participation in such courses.

### **10.0 Deferment of Admission/Studies**

A candidate offered admission by the University shall be allowed to defer the admission if he/she satisfies the following conditions:

- i. Accept the offer of admission by completing the University acceptance form and online registration
- ii. Pay all prescribed fees for the session in which he/she was admitted
- iii. Apply to the Registrar in writing for the deferment of admission or studies to a specific academic session
- iv. Apply in writing to the Registrar for resumption on expiration of the deferment period.

The maximum period for deferment of admission/studies shall be one academic session unless otherwise extended by approval of Senate. A student who fails to return to the University at the expiration of the deferment period shall forfeit his/her right of admission/studies.

### **11.0 Condition for Voluntary Withdrawal**

Any student who fails to register and attend lectures for one academic year without approval of Senate shall be considered to have voluntarily withdrawn from her/his programme.

## **10.0 MATRICULATION AND INDUCTION CEREMONY**

Every new student of the Department must be matriculated before he/she is recognized as having entered the academic community of the University. At the ceremony, students are expected to take the matriculation oath. All students are required to be formally dressed (i.e. complete with academic gowns) during the induction ceremony. Matriculation usually marks the end of students' registration. Students are usually issued with matriculation numbers, with which they will obtain Identity Cards from the Students Affairs Division.

## **11.0 REGULATION ON THE USE OF BIOLOGY LABORATORIES**

Students coming into the laboratory for experimental aspects of the discipline are expected to observe, with utmost good faith, the following laboratory regulations for proper usage and management of our laboratories:

- ❖ Any student coming into the laboratory for his or her Practical Work MUST put on his/her lab coat or else he/she would not be allowed to enter the laboratory for the practical.
- ❖ Eating or drinking of any kind and at any time while in the laboratory is highly prohibited.
- ❖ Students are not expected to litter the laboratory space.
- ❖ Playing or fighting inside the laboratory is highly prohibited. It is an offence to sit or lie on top of laboratory bench during practical biology session and after class.
- ❖ Buying and selling inside the laboratory is not allowed at anytime.
- ❖ No student is allowed to remove any equipment from the laboratory.
- ❖ No student is allowed to remove laboratory stool from the laboratory.

## **12.0 STUDENT WORK LOAD:**

### **12.1 Full-time and Residency Requirements**

All undergraduate programmes offered in the College are full-time and fully residential. Students may not undertake any regular paid employment within or outside the University while in the programme.

A student shall normally register for a minimum of thirty (30) and a maximum of forty-eight (48) credit units in any academic year, except in the case of direct entry and inter-university transfer students. This means that a student should take between 15 and 24 credits in any given semester and no student can earn more than forty-eight (48) credit units at the end of an academic year.

In the special case of direct entry and inter-university transfer students, who follow a three-year degree programme, this maximum may be exceeded by the number of credit units assigned to the General Studies courses, VUNA Theology courses, and Students' Industrial Work Experience Scheme (SIWES) which they must take.

## **12.2 Audited Courses**

A student may register to audit a course unit outside his/her programme of study according to his/her interest, but subject to departmental approval. A student may write examinations in such audited courses, and the scores for such examinations reflected in his/her academic records, but he/she may not earn credits for them.

## **12.3 Conditions for Probation**

If at the end of the session, a student's Cumulative Grade Point Average (CGPA) is less than 1.00, then he/she will be placed on probation for a specified period of one full session. A student who is on probation should re-register for all the failed courses before registering the current ones. Such a student should not exceed a credit load of 15 for that semester. If the student still has a GPA less than 1.00 at the end of the session, he/she is advised to withdraw from the programme. He/she may shop for admission in another programme.

## **12.4 Conditions for Withdrawal**

If at the end of a probation period, a student's CGPA is still less than 1.00, the student will be asked to withdraw from his/her programme of study. A student who is so withdrawn is free to seek transfer to another programme in any Department within and outside the College that may be willing to accept him or her.

## **13.0 THE COURSE CREDIT SYSTEM**

Teaching in the Department is by the 'course system'. This is referred to as a "quantitative" system or organization into unit courses which are examinable, and for which students earn credit(s) if passed. The courses are arranged in a progressive order of levels of academic progress, e.g. Level or Year 1 courses are 100 level: 1111, 1121, 1131, 1141, 1112, 1122, 1132 and level 2 or year 2 courses are 200 level, e.g. 2111, 2121. The numbering of courses enables students to immediately know those courses offered during the first or the second semester as well as courses taken in semesters as well as courses taken in various years.

## **14.0 CREDIT UNITS**

Credit Units consist of specified number of student – teacher contact hours per week per semester. Credit units are used in two complementary ways, one, as a measure of course weighting and the other, as an indicator of student workload.

## **15.0 CONTINUOUS ASSESSMENT**

Continuous Assessment is a method of periodic assessment for students so as to reduce over-dependence on end-of-course examinations. It normally contributes up to a maximum of 40% of the total course mark of each course. Continuous Assessment is by means of term papers, frequent tests, assessment in laboratory assignments etc.

## **16.0 PASS**

A pass in a course is obtained by scoring at least the minimum course mark of 40% in the B. Sc. programme.

## **17.0 EXAMINATION**

### **18.0 SEMESTER EXAMINATION**

Considering that the VERITAS University of Nigeria, Abuja has adopted the Course System, examinations are administered at the end of each course, which is usually at the end of the semester.

### **19.0 SETTING OF QUESTIONS**

All examinations should have:

- first examiner (normally the Academic Staff Member in charge of the course) and
- second Internal Examiner (a Moderator) as may be approved by the Departmental Board of examiners.

Questions to be set and the number to be answered shall be at the discretion of the examiner(s) subject to the approval of the Departmental Board of Examiners usually consisting of all the academic staff of the Department.

- In the case of 400 level examinations External Examiners shall participate in the moderation of question papers and vetting of the answer scripts.
- Examiners shall be expected to submit question papers, marked answer booklets and raw scores normally within two weeks after the date of examination.

### **20.0 EXTERNAL EXAMINER SYSTEM**

External Examiners are used only in the final year of the undergraduate programme programmed to assess final year courses and projects, and to certify the overall performance of the graduating students as well as the quality of facilities and teaching.

### **21.0 WITHDRAWAL AND PROBATION**

- a. Probation simply implies a warning lasting for period of one academic session and extended to a student whose performance falls below the expected specified minimum standard; the common dominator in assessing being the student's overall (CGPA).
- b. To be considered eligible to graduate, a student needs to earn an overall GPA of at least 1.00
- c. A student whose CGPA falls below 1.00 at the end of a session shall be placed on a period of probation for one academic session.

- d. At the end of a particular period of probation, if the student still earns a CGPA of less than 1.00, he shall be required to withdraw from the programme.
- e. In order to minimize waste of human resources, consideration is normally given to students withdrawn from 200 level of the programme to transfer to other related programmes within the College of Natural Sciences or to any other programmes in other faculties within the University perceived as relevant for the purpose.

## **22.0 REPEATING FAILED COURSES**

Subject to the conditions for the withdrawal and probation, a student may be allowed to repeat the courses failed at the next available opportunity provided that the total number of credit units he has to carry over during that session shall not exceed 48. The Grade Points earned in all the attempts in such courses will count towards the CGPA.

## **23.0 UNIVERSITY REGULATIONS**

### **24.0 CLASS ATTENDANCE**

For any student to be eligible to sit for an examination, he/she must have made up to 75% in attendance. A list of the registered students in the college would be made available to students present in the lecture/practical/seminar to sign. Lecturers are responsible for collecting the signed attendance sheets and submitting them to the College Officer. Percentage attendance would be collated at end of the semester by the department before the examination. Heads of Departments must up the attendance of students to advise them accordingly.

### **25.0 EXAMINATION RULES**

College of Natural and Applied Sciences in line with the entire VERITAS University of Nigeria runs a course credit system and each course has an examination. A student's academic performance is continuously assessed throughout the semester by means of test, assignments, term papers among others. Senate approves 2 tests and 2 assignments for 40%; each semester the remaining 60% is for examination score. Any student who has no score for continuous assessment earns an F grade for the course even if he/she has 60/60 as examination score.

- a. A student who reports for an examination after 30 minutes of the commencement of the examination would not be allowed to sit for that examination.
- b. If a student has acceptable reasons for missing an examination such a student can only be allowed to sit for that exam in the next available opportunity, which is the following session or during the long vacation.
- c. A student who is on probation i.e. a student who has GPA less than 1.00, should re-register for all the failed courses before registering the current ones. Such a student should not exceed a credit load of 15 for that semester (except he is a spill-over student). If the student still has a GPA less than 1.00 two sessions, he/she is advised to withdraw from the programme and shop for admission in another programme.

## **26.0 EXAMINATION MISCONDUCT**

### **26.1 DEFINITION**

- i. If a student is found with written materials on paper or mobile phones relevant to the examination/test in the examination hall during the conduct of examination.
- ii. Cheating in the examination hall, either by copying from another student's answer booklet, passing on or receiving information in any form such as talking or listening to or writing within or outside the examination hall.
- iii. Failing to sign in examination misconduct form when caught cheating in an examination hall.
- iv. Willful disruption of the course of an examination.
- v. Examination impersonation, which is writing examination or test for another student.
- vi. Plagiarism: Copying and downloading other people's work for the project or assignment.

### **26.2 PROCEDURE FOR HANDLING EXAMINATION MISCONDUCT**

- The student is made to state and sign the examination misconduct form with his/her own version of the case. Thereafter, the student is allowed to continue to write that examination using another answer booklet. The form should be counter-signed by a student witness if available.
- Then the alleged offender's answer-booklet will be retrieved by the Chief Invigilator and stapled to the signed form for onward transmission through that student's department to the Examination Misconduct Committee. The latter will then decide the level of the crime committed and the corresponding penalty.
- The penalty ranges from canceling of the student's paper to rustication for one year. In the case the student refuses to sign the misconduct form, the security unit will be invited to remove the said student from the examination hall.
- The Chief Invigilator should write a report packaging the defaulter's booklet to be forwarded to the Examination Misconduct Committee for appropriate action.

## **27.0 ABSENCE FROM LECTURES OR EXAMINATIONS**

- Excuses to be away from lectures for whatever reason must be put in writing to the Head of Department.
- When a student misses an examination, he/she is advised to apply in writing to the senate through his/her Head of Department, Dean and Registrar to Senate, to be granted an opportunity to take the examination. If the reason for missing such examination is cogent enough, Senate may approve the application for the student to take the examination at next available opportunity.

- In case of ill-health, a medical report issued by an authorized medical practitioner and counter-signed by the Medical Director of the Medical Center of Veritas University of Nigeria.

## 28.0 SUSPENSION OF STUDIES

On no account should any matriculated student of a university keep away from his/her studies for a reason whatsoever without informing the University authority through his/her Head of Department, Dean of Faculty and the Registrar. The information **MUST** be in writing, stating reasons, which should be financial constraints or ill health (with medical report attached) to the Senate for suspension of studies. Students who flout this order may have their studentship terminated.

## 29.0 ACADEMIC ADVISERS

Academic advisers are assigned to each student each session to counsel the student on his or her academic performances. Students are free to meet with their academic adviser at least once in semester for counseling. The students could also meet the HOD who is readily available and accessible to look into their problems.

## 30.0 SENATE DECISIONS ON FORGERY

Forgery is viewed by Senate as a very serious breach of student matriculation oath, rules and regulations of the University. The punishment for this offence is expulsion (dismissal) from the university. Some students forge credentials to gain admission into the University while some forge class Admit Cards to gain entry into lectures and examinations. Forgery of University documents such as fee clearance cards, course registration forms and fee receipts attracts same punishment.

## 31.0 GRADING SYSTEM:

The grading system of the University is as follows:

				Grades	Grade Points
70% - 100%	-	-	-	A	5
60% - 69%	-	-	-	B	4
50% - 59%	-	-	-	C	3
45% - 49%	-	-	-	D	2
40% - 44%	-	-	-	F	0



## 32.0 GRADUATION

For any student to graduate, he must have obtained a minimum total of 160 credit units for a four-year programme. Students must pass all core courses and electives before they can graduate.

## 33.0 AWARD OF DEGREE:

The type of degree awarded to a student will be determined by the final Cumulative Grade Point Average of the student in his/her final year as shown below:

<b>CLASS OF DEGREE</b>	<b>CGPA REQUIRED</b>
First Class	4.5 - 5.0
Second Class Upper	3.5 - 4.49
Second Class Lower	2.4 - 3.49
Third Class Lower	1.50 - 2.39
Pass	1.0 – 1.49

## 34.0 BIOLOGICAL SCIENCES CURRICULUM

### 1. B. Sc. Hons. Applied Microbiology

*Note: Order of course coding according to specialization*

1 = *General Biology Courses*

2 = *Microbiology Courses*

3 = *Zoology Courses*

4 = *Biochemistry Course*

5 = *Botany/Plant Science Courses*

## CURRICULUM FOR B.Sc. APPLIED MICROBIOLOGY

<b>100 LEVEL</b>		<b>FIRST SEMESTER</b>	
<b>NEW CURRICULUM</b>			
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
<b>GES 1011</b>	Communication in English I	2	
<b>GES 1021</b>	History and Philosophy of Science	2	
<b>GES 1031</b>	Nigeria Peoples and Culture	2	
<b>GES 1041</b>	Use of Library, Study Skills and ICT	2	
<b>BIO 1111</b>	General Biology I	3	
<b>BIO 1121</b>	Biological/Laboratory Techniques	2	
<b>CHM 1111</b>	General Chemistry I	2	
<b>CHM 1121</b>	General Chemistry Practical I	1	
<b>PHY 1111</b>	General Physics I	2	
<b>PHY 1121</b>	Experimental Physics I	1	
<b>MTH 111</b>	General Mathematics I	3	
	<b>TOTAL</b>	<b>22</b>	
<b>100 LEVEL</b>		<b>SECOND SEMESTER</b>	
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
<b>GES 1011</b>	Communication in English II	2	
<b>GES 1022</b>	Logic, Philosophy & Human Existence	2	
<b>GES 1032</b>	Communication in French	2	
<b>GES 1042</b>	Community Service	1	
<b>BIO 1112</b>	General Biology II	3	BIO 1111
<b>CHM 1112</b>	General Chemistry II	2	CHM 1111
<b>CHM 1122</b>	General Chemistry Practical II	1	CHM 1121
<b>PHY 1112</b>	General Physics II	2	PHY 1111
<b>PHY 1122</b>	Experimental Physics II	1	PHY 1121
<b>MTH 1112</b>	General Mathematics II	3	MTH 1111
<b>THG 1712</b>	Introduction to Church History	2	

<b>MTH 1212</b>	Basic Statistics for Sciences	2	
	<b>TOTAL</b>	<b>23</b>	
<b>200 LEVEL FIRST SEMESTER</b>			
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
<b>GES 2011</b>	Peace and Conflict resolution	2	
<b>GES 2021</b>	Entrepreneurship & Innovation (Theory & practice)	2	
<b>THG 2711</b>	Spiritual Theology & Catechesis	2	
<b>BIO 2111</b>	General Genetics I	2	
<b>BIO 2121</b>	Biometrics	2	
<b>BIO 2131</b>	General Physiology	2	
<b>BIO 2141</b>	Biological Classification & Taxonomy I	2	
<b>BCH 2111</b>	General Biochemistry	2	
<b>BOT 2511</b>	Morphology of Flowering Plants	2	
<b>MCB 2221</b>	Microbiological Techniques	2	
<b>MCB 2231</b>	Introductory Microbiology	2	
<b>ZOO 2311</b>	Invertebrate Zoology	<b>2</b>	
	<b>Total</b>	<b>24</b>	
<b>SECOND SEMESTER</b>			
<b>EDC 2012</b>	Business Creation & Growth	2	
<b>GES 2022</b>	Application of Computer	2	
<b>BIO 2112</b>	Introduction to Ecology	2	
<b>BIO 2132</b>	Developmental Cell Biology I	3	
<b>BOT 2512</b>	Biology of Seed and Seedless Plants	3	BOT 2311
<b>MCB 2222</b>	Mycology	2	
<b>MCB 2232</b>	General Microbiology	2	MCB 2231
<b>PHS 2612</b>	Introduction to Public & Community Health	2	
<b>THG 2722</b>	Social Teachings of the Church	2	
<b>ZEB 2412</b>	The Chordates	2	
<b>ZEB 2422</b>	Introduction to Parasitology	<b>2</b>	
	<b>Total</b>	<b>22</b>	
<b>300 LEVEL FIRST SEMESTER</b>			
<b>Course</b>	<b>Course Title</b>	<b>Credit</b>	<b>Prerequisite</b>

<b>Code</b>		<b>Units</b>	
<b>BIO 3111</b>	Molecular Genetics & Biotechnology	<b>3</b>	
<b>BIO 3121</b>	Field Course	<b>1</b>	
<b>BIO 3131</b>	Developmental Cell Biology II	<b>2</b>	
<b>MCB 3221</b>	Pathogenic Bacteriology	<b>3</b>	
<b>MCB 3231</b>	Environmental Microbiology	<b>3</b>	
<b>MCB 3241</b>	Virology	<b>3</b>	
<b>MCB 3251</b>	Soil Microbiology	<b>3</b>	
<b>MCB 3261</b>	Microbial Physiology & Metabolism	<b>3</b>	
	<b>Total</b>	<b>24</b>	

### **300 LEVEL SECOND SEMESTER**

<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
	<b>Industrial Attachment (SIWES)</b>		

### **400 LEVEL FIRST SEMESTER**

<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
<b>BIO 4111</b>	Research Methodology	2	
<b>BIO 4121</b>	Seminar Topic	1	
<b>BIO 4131</b>	Principles of Epidemiology and Public Health	3	
<b>BCH 4111</b>	Enzymology	3	
<b>MCB 4211</b>	Industrial Microbiology II	3	
<b>MCB 4221</b>	Analytical Microbiology and Quality Control	2	
<b>MCB 4231</b>	Agricultural Microbiology	2	
<b>MCB 4241</b>	Bioremediation	2	
<b>MCB 4251</b>	Petroleum Microbiology	2	

	<b>Total</b>	<b>20</b>	
<b>400 LEVEL SECOND SEMESTER</b>			
<b>Course Code</b>	<b>Course Title</b>	<b>Credit Units</b>	<b>Prerequisite</b>
<b>BIO 4112</b>	Immunology and Immunochemistry	3	
<b>BIO 4122</b>	Research Project	6	
<b>MCB 4222</b>	Microbial Genetics	3	
<b>MCB 4232</b>	Pharmaceutical Microbiology	3	
<b>MCB 4242</b>	Food and Dairy Microbiology	3	
<b>MCB 4252</b>	Microbial Ecology	2	
	<b>Total</b>	<b>20</b>	

### COURSE DESCRIPTION

#### **MTH 1111: General Mathematics I (3 Credit Units) (Pre-requisite: Credit in WAEC Mathematics)**

Elementary set theory: subsets, union, intersection, complements, Venn diagrams. Real numbers, integral, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic functions, binomial theorem, geometric representation of 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 formula.

#### **MTH 1112: General Mathematics II (3 Credit Units) (Pre-requisite: MTH 1111)**

Functions of real variables, graphs, limits and continuity. The derivative as a limit of rate of change. Techniques of differentiation. The straight line, parallel and perpendicular lines, angle between two straight lines, the distance between points from a line parametric equations, tangents and normal. Curve sketching. Rules of differentiation, maxima and minima, integration as an inverse of differentiation, integration as a limit of a sum, areas under a curve, volumes.

#### **MTH 1212: Basic Statistics for Sciences (2 Credit Units)**

Nature and scope of statistics. Populations and samples. Tabulation of data frequency table, discrete and grouped data frequency polygon. Curve and Ogive, Measures of location: mean, median, mode, deviation, standard deviation, quartiles deciles scattered diagrams, fitting of straight lines, linear regression, correction coefficient, rank correlation coefficient, measures of skewness. Simple concept of probability. Introduction to variables (discrete and continuous).

**BIO1111: General Biology I (3 Credit Units)**

Characteristics and classification of living things; the cell theory; animal and -

plant cell structures and organisation: functional anatomy and diversity of cellular organelles. Interrelationship of organisms, niches, food chains, trophic levels, productivity and energy cycling elements of population ecology and ecological methods, and types of habitats. Heredity and evolution.

**BIO 1121: Biological/Laboratory Techniques (2 Credit Units)**

Laboratory safety, Laboratory hazards; care and use of laboratory equipments. Microscopy I; Stains, types of stains, staining techniques, Microtomy - types and their applications; Preparation of materials or specimens for sectioning; Dissection – invertebrates and vertebrates; chromatography, Techniques for drawing and labeling in biology; Preservatives, fixatives, types and properties, preparation of preservatives, fixatives, Instrumentation.

**BIO 2111: General Genetics I (2 Credit Units) (pre-requisite BIO 1111)**

Hereditary and non-hereditary characteristics. Probability and tests of goodness of fit. Quantitative inheritance; variation in genome structure. Introduction to population genetics. Importance of genetics, its applications in legal process, marriage counseling, settling maternal and paternal disputes, etc.

**BIO 2131: General Physiology (3 Credit Units):**

Aspects of the chemistry of organic compounds of biological importance; porphyrins, chlorophylls, cytochromes, haemoglobins, carotenoids, oxanthophylls, flavins, melanines, pteridines, anthocyanins, phosphagen, carbohydrates, lipids and fats, general characteristics of enzymes, nutrition, digestion and absorption in animals. The membrane system of cells: chemical and ultra-structural properties. Intercellular communications, transport across cell membranes. Homeostasis. Biological oxidations, composition, structure, nucleic acids, biosynthesis: photosynthesis and protein synthesis. Genetic interactions, chemical basis of inheritance, DNA, RNA. Genetic linkage and recombination, mutation, cytogenetic effects of radiation, and chemical agents.

**BIO 2141: Biological Classification and Taxonomy (2 Credit Units):**

Definitions: Classification, taxonomy, systematics. Brief historical background – pre Linnean, Linnean, Darwinian, in taxonomy of plants. Types of classification systems, biological nomenclature, taxonomic hierarchies; aims and objectives of classification; principles and practice of taxonomy, taxonomic characters, convergence and divergence, speciation, phylogenetic systems, selected families of flowering plants with emphasis on geographical spread, morphological variation within each family, interfamily relations. Field herbarium, and herbarium techniques and importance.

**BIO 1112: General Biology II (3 Credit Units)**

A generalized survey of plant and animal kingdoms based mainly on the study of similarities and differences in the external and internal features and ecological adaptations of the different forms. Groups to study include viruses, bacteria, fungi, algae, bryophytes, pteridophytes and spermatophytes (gymnosperms and angiosperms) protozoa, porifera, Cnidarians, platyhelminthes, nematode, annelid, arthropods, mollusc, echinodermata, protochordata and vertebrata.

**BIO 2121: Biometrics (3 Credit Units):**

Normal distribution, test of skewness and kurtosis; binomial and poisson distribution; measure of central tendency; test for goodness of fit; correlation and linear regression; introduction to experimental design.

**BIO 2112: Introduction to Ecology (2 Credit Units):**

Definition of concepts; ecosystems, populations and communities in the ecosystem, pRelationship between individuals, or groups within a species, and between individuals, or groups of different species. Some aspects of applied ecology e.g. biological control, behavioural ecology. Population and growth: growth density-dependent and density-independent limiting factors. Interactions of organisms: predation, competition and other interactions. Concept of niche, world distribution of plants and animals. Changes in ecosystem: evolution and succession, speciation and adaptation. Ecology of Man.s

**MCB 2122: Mycology (3 Credit Units)**

Detailed account of the systematics, morphology, life cycles, physiology and dissemination of fungi with particular reference to those of economic importance in industry and agriculture. Consideration of mycological techniques. Structure, reproduction and classification of pathogenic fungi; laboratory – methods of study; pathology and immunology of superficial systemic mycoses and accinomycoses. Classification of pathogenic fungi - their structures and reproductions, dermatophytosis, candidiasis, cryptococcosis, aspergillosis.

**BIO 2132: Developmental Cell Biology I (3 Credit Units)**

Generalized structure of the cell. Molecular composition of cell; origin of macromolecules, polysaccharides, polypeptides and lipids. History and present trends in cell biology, reproduction and cell division, differentiation and growth, chromosome morphology. DNA replication and protein synthesis; transcription, and translation. Genes and the genetic code. Genetic engineering. Movement of molecules in and out of the cell; passive diffusion facilitated diffusion, active translocation, osmosis and pinocytosis. Mechanisms of protein transport within and out of the cell.

**MCB 2221: Microbiological Techniques (2 Credit units) (pre-requisite BIO 1121)**

Principles of microscopy II; Introduction to Classifications of microorganisms; Definitions of basic microbial practical concepts - specimen, sample, etc., Culture media in biological/microbiological studies, culture plate, culturing techniques, colony, colony counting, stains, types and classes of stains, staining techniques, gram staining,; Culturing of bacteria, fungi, virus, reading of culture plates, methods of identifying microbial growth, parasitological techniques, photometry, colorimetry, etc, etc.

**BIO 2152: Biogeography and Climatology (2 Credit Units):**

Definition of concepts, biogeography, climatology. Distribution of world fauna and flora, zoogeographical and floristic regions of the world, comparison of tropical and temperate fauna and flora, dispersal and colonization, dynamic zoogeography, relationships between revegetation, soil type and climate.

**MCB 2231: Introductory Microbiology (2 Credit Units)**

History and development of microbiology; Pure and Applied aspect of microbiology; General characteristics of microorganisms (including their growth and reproduction); Microbial techniques including sterilization and disinfection, economic importance of microorganisms. Microbial cell types – prokaryotes and eukaryotes, Bacterial cell structure and function

**MCB 2241: Microbial Physiology and Metabolism (2 Credit Units)**

Dynamics of growth, nutrition and energy metabolism of microorganisms; effect of physical and chemical factors on growth; Biochemistry of various microbial processes such as transport and respiration; Bio-synthesis of microbial products; Aerobic and anaerobic dissimilation; Regulation of cell cycle in bacteria and yeast; Monomer and polymer synthesis.

**MCB 2242: Introductory Environmental Microbiology (2 Credit Units):**

MCB2242: Microorganisms and their importance in aquatic systems and disposal. Ecology of microorganisms in freshwater. Pollution, and self-purification of water. Introduction to marine microbiology. Disease transmission by water. Microbiology of waste disposal. Biological oxygen demand (BOD) and chemical oxygen demand (COD) for sewage and water.

**MCB 2262: Microbial Ecology (3 Credit Units)**



Microbes and ecological theory; Physiological, morphological, and genetic adaptations of micro-organisms to their environment; Microbial interactions; Micro-organisms in ecosystems; Microbial bioconversion

**MCB 2272: General Microbiology (2 Credit Units)**

Systematic classification of microorganisms; Microbial variation and heredity; Biological and biochemical reactions in microorganisms; Microbiological and chemical examination of water; Water quality standards; Microbiological examination of sewage and methods of sewage treatment and disposal; Disease transmission by water; Fate of chemical pollutants in aquatic ecosystems; Visits to sewage plants and water treatment plants.

**BCH 2111: General Biochemistry I (2 Credit Units)**

Chemistry of amino acids, proteins and their derivative, methods of isolation and identification acidity, alkalinity, PH and pK values and their effects on cellular activities, buffers, chemistry/structures of carbohydrates, lipids and nucleic: primary, secondary, tertiary and quaternary structures of proteins, determination and biochemical applications of these structures. Nomenclature of nucleosides and nucleotides, effect of acid and alkali on hydrolysis of nucleic acids, structures and functions of major cell components, prokaryotic versus eukaryotic organisms.

**BOT 2511: Morphology of Flowering plants (2 Credit Units):**

Origin and evolution of angiosperms, similarities between gymnosperms and angiosperms; forms, structure and functions of flowering plants, root, stem, leaf, flower and fruits of plants with their various modifications.

**BOT 2512: Biology of Seed and Seedless Plants (3 Credit Units):**

General characteristics of seedless plants and their classification into Bryophyta, Thallophyta and Pteridophyta. Morphology and general characteristics of representatives. Relationships and differences between classes, and advancement of lower plant groups.

General characteristics of spermatophytes. Differences and similarities between gymnosperms and angiosperms. Classification and characteristics of classes of gymnosperms and angiosperms.

**ZEB 2311: Invertebrate Zoology (3 Credit Units):**

Definition, and general classification of invertebrates, characteristics of the nine major phyla of the division invertebrate. The inter-relationships, life history, adaptations, economic importance of the invertebrate phyla with selected examples from Protozoa, Porifera, Diploblastica, Platyhelminths, Nematoda,

Arthropoda, Annelida, Mollusca and Echinodermata. Study the morphology and physiology and life cycle/reproduction of some examples of each family or class of every phylum of the nine major phyla. Evolution and adaptive biology of the major invertebrate groups.

**ZEB 2412: The Chordates (2 Credit Units):**

Evolution, classification and general characteristics of the fishes (Agnatha, Chondrichthyes, Osteichthyes) and the tetrapods (Amphibia, Reptilia, Aves, Mammalia), with special reference to taxa of afro-tropical origin, evolutionary adaptations for terrestrial life. General characteristics of chordates, their classification and organization. Introduction to the morphology and anatomy of chordates.

**PHS 2612: Introduction to Public and Community Health (2 Credits)**

Public and Community Health concepts, socio-cultural, physical/chemical and biological environment /community. Diseases, their causal pathogens, classification of pathogenic organisms, their characteristics, economic importance, disease prevention and control. Health education, personal and group hygiene. Sanitation and its importance, etc.

**300 LEVEL COURSES FOR THE FIVE B. Sc. PROGRAMMES**

**BIO 3111: Molecular Genetics & Biotechnology (3 Credit Units) – Prerequisites BIO 2111**

Concept and scope of molecular genetics, basis of molecular genetics, Chromosomes, genes, DNA, structure and functions of DNA, DNA replication, Molecular biology of gene function, gene interaction. Gene transcription and regulation of gene transcription. Recombination DNA technology, application of recombination DNA technology. Genomics. Gene manipulation, Bioinformatics, PCR, Microarray technology, Biotechnology/genetic engineering, Sequencing of genes. Microbial strain selection and improvement: mutation, protoplast fusion, metabolic engineering, Importance of biotechnology in medicine, agriculture, industry, etc.

**BIO 3151: Field Course (1 Credit Unit):**

Field trip to appropriate (ecological) study sites, industrial factories, research institute(s), institutions of pure and applied biology, etc. Submission of written technical report on a field trip undertaken by scholars; Written examination on the field course at the end of the semester.

**BIO 3161 Pollution Biology (2 Credit Units):**

Concept of pollution, types of pollution – air, land, noise pollutions and the sources of their pollutants, types of pollutants, indices of environmental pollution. Physical, chemical and biological characteristics and effects of pollution. Algal bloom. BOD depletion of aquatic pollution. Ecology of microorganisms in fresh, estuarine and marine environments. Pollution control and prevention

**BIO 3131 Developmental Cell Biology II (3 Credit Units):**

Current advances in cell and molecular biology, molecular basis of plant and animal reproduction- gamete formation, cell division, differentiation and growth, detail study of the molecular basis of cell structure - and development of organelles, proteins and nucleic acids. A survey of the current status of microbial genetics (bacterial, viral, protozoal and fungal) including discussion of methods and findings in the areas of mutations, isolation and biochemical characterization of mutants; Adaptation, transformation, transduction, conversion and conjugation; General and specialized methods and techniques in microbial genetics

**ZEB 2422: Introduction to Parasitology (2 Credit Units):**

A brief history of Parasitology in Nigeria in general. Animal association and concepts of parasitism, physiological and ecological aspects of parasites with emphasis on the problems of host/parasite, parasite/parasite relationship, antagonistic and synergistic reaction, effects of parasites on host.

The phenomenon and interrelationship between parasites and their hosts (including injurious effects of parasites on their hosts). Morphology, life cycles and life cycle patterns, pathogenesis and pathology, epidemiology, diagnosis, immunity, economic importance, prevention and control of relevant examples of parasites and diseases caused by the parasites in the tropics with particular reference to Nigeria and West Africa sub-region. Groups to study should include viruses, rickettsia, spirochetes, protozoa, helminthes (trematodes, cestodes and nematodes), and arthropods. Parasitic zoonoses.

**BIO 3121: Field Course (1 Credit Unit):**

Field trip to appropriate (ecological) study sites, industrial factories, research institute(s), institutions of pure and applied biology, etc. Submission of written technical report on a field trip undertaken by scholars; Written examination on the field course at the end of the semester.

**MCB 3211: Industrial Microbiology I (3 Credit Units)**

Nature of industrial microbiology: fermentation in industrial microbiology. Aspects of the biology of bacteria, moulds, yeast, actinomycetes and viruses of importance in various fermentations. Nutrition of industrial organisms. Criteria for the choice of raw materials used in industrial media. Raw materials used in compounding industrial media. Design and operation of a fermentation unit: batch culture, continuous culture: turbidostat and chemostat. Culture techniques and

preservation/maintenance of cultures: culture collections. Microbial strain selection and improvement: mutation, protoplast fusion, metabolic engineering, genetic engineering. Overproduction of industrial materials, production of auxotrophic mutants. Extraction and purification of industrial products.

### **MCB 3221: Pathogenic Bacteriology (3 Credit Units)**

Host -parasite relationship; Pathogenic bacteria and disease; Virulence, spectrum and symptoms of infection, treatment and control; Koch's postulates; Methods of isolation of pathogens, bacterial infections and disposal of pathogenic cultures;.

Structure, reproduction and classification of pathogenic fungi; laboratory –

methods of study; pathology and immunology of superficial systemic mycoses and actinomycoses. Classification of pathogenic fungi - their structures and reproductions actinomycoses and chlamydial infections

### **MCB 3231 Environmental Microbiology (2 Credit Units)**

Air microbiology; sources of air pollution; Indices of air pollution; Physical and microbiological properties of air in different environments; Microorganisms and other organisms important in aquatic systems and disposals; Ecology of microorganisms in fresh, estuarine and marine water; Self purification of water; Microbiological and chemical examination of water; Water quality standards; Microbiological examination of sewage and methods of sewage and disposals; Disease transmission by water; Biodegradation of pollutants and molecular recalcitrance; Visits to sewage plants and water treatment plants.

Morphology, biochemistry and ecology of marine and estuarine microorganisms, including algae, bacteria, protozoa and viruses; Microbiology of mangrove swamps and marine sediments; Deep sea microbiology; Microbiological processes in connection with decomposition of organic matter and regeneration of nutrients; Types, distribution, assessment and importance of microorganisms in the estuarine environment.

### **MCB 3241: Virology (2 Credit Units)**

Brief history and introduction to virology. Properties, structure and organization of viruses. Classification of viruses. Cultivation of viruses by tissue/organ culture; cell culture (suspension and monolayer cell culture); embryonated eggs; laboratory animals. Detection of viruses in cell culture. Multiplication and replication of viruses. Purification and characterization of viruses. Quantification of viruses. Host responses to viral infection. Some virus diseases of man and animals. Control of viral diseases. The bacteriophage will be used in some of the laboratory practical, to demonstrate the characteristics of the viruses. Representative animal viruses will also be studied in the laboratory to demonstrate the nature of viral virulence.

### **MCB 3251: Soil Microbiology (2 Credit Units)**

The characteristics of soil environment; Textural triangle; Microbial! Flora and fauna and their activities in the soil; Biogeochemical cycles including nitrogen - fixation with emphasis on roles played by various microbes; Mineral transformation by microorganisms; Ideological relationship among (lie soil pathogens; Biodegradation and bio generation; Effects of pesticides and other chemicals on soil microorganisms.

**MCB 3261: Microbial Physiology and Metabolism (2 Credit Units)**

Dynamics of growth, nutrition and energy metabolism of microorganisms; effect of physical and chemical factors on growth; Biochemistry of various microbial processes such as transport and respiration; Bio-synthesis of microbial products; Aerobic and anaerobic dissimilation; Regulation of cell cycle in bacteria and yeast; Monomer and polymer synthesis.

Industrial field experience in any of the following: Medical and Public Health institutions, environmental sanitation agency, veterinary, etc.

**BIO 3002: Students Industrial Work Experience Scheme (SIWES) (6 Credit Units):**

Industrial work experience in any of the following areas: Food, Oil, Breweries, Floor mills, Fisheries, Wildlife management, Biology of Aquatic Environment, Pest Control, Animal and Public Health.

**400 LEVEL COURSES FOR THE FIVE B.Sc. PROGRAMMES**

**BIO 4111: Research Methodology (3 Credit Units):**

Introduction to elements and concepts of philosophy of science; Use of Biological Abstracts and Literature Survey, Ethical considerations in the research involving the use of laboratory animals; Design of Biological experiments and biostatistics; Guidelines for preparation and submission of thesis and scientific reports for journals.

**BIO 4121: Seminar Topic (1 Credit Unit):**

Literature research/review on selected topic under the supervision of an academic staff, each student shall make an oral presentation of the write-up in class. After the oral presentation the corrected writing up is finally bound and submitted.

**BIO 4131: Principles of Epidemiology and Public Health (2 Credit Units):**

Statistical applications to epidemiology. Nature of epidemiological investigations. Spectrum of infection. Hard immunity Latency of infections. Multifactorial systems in epidemics. Zoonoses. Antigenic drifts. Biological products for immunization. Recommended immunization schedules. International control of infectious diseases.

**BIO 4111: Research Methodology (2 Credit Units)**

Introduction to elements and concepts of philosophy of science; Use of Biological Abstracts and Literature Survey, Ethical considerations in the research involving the use of laboratory animals; Design of Biological experiments and biostatistics; Guidelines for preparation and submission of thesis and scientific reports for journals.

**BCH 4111: Enzymology (3 Credit Units)**

Vitamins and co-enzymes; Fats and water-soluble vitamins; Structures and functions of vitamins and co-enzymes; Classification and nomenclature of enzymes. Genetics of enzymes and inhibition; Mechanisms of enzyme-catalyzed reactions; Effects of temperature, pH, ions, and inhibitors on enzyme-catalyzed reactions. Michaelis – Menten equation; Allosteric/Regulatory enzymes; Active sites of enzymes; Estimation of kinetics parameters – enzyme activities,  $K_m$ ,  $V_{max}$ ,  $K_i$ , etc.; Zymogen activation, digestive enzymes, etc., Production, isolation, purification and characterization of enzymes; Recent advances in enzymology..

**BIO 4121: Seminar Write-up (1 Credit Unit)**

Under the supervision of an academic staff, each student shall make an oral representation of the seminar topic. The oral presentation shall be made before and after writing up.

**MCB 4211: Industrial Microbiology 11 (3 Credit Units)**

Production of beer, wines, spirits, industrial alcohols. Microbiological production of dextrans. Microbiological production of organic acids: lactic acid, gluconic acid, itaconic acid, citric acid, acetic acid and vinegar etc. Production of anti-tumour agents, ergot alkaloids. Steroid transformation. Manufacture of amino acids and vitamins: L-lysine fermentation and vitamin B<sub>12</sub>. Manufacture of antibiotics. Mass cultivation of microorganisms: manufacture of commercial baker's yeast, production of mushroom inoculum, manufacture of rhizobium inoculum. Viral vaccine production. Production of bacterial toxoids. Biocatalyst and their immobilization. Biodegradation of industrial raw materials and products

**MCB 4221: Analytical Microbiology and Quality Control (2 Credit Units)**

Microorganisms are reagents in qualitative analysis; Selection and response of test organisms in assays (antibiotics, amino acids, vitamins etc). Responses of microorganisms used in assays. Obtaining and measuring responses; Preparation of assay samples; Methods of assays; Interpretation of results; Aspects of quality control; Plant and equipment sanitation Microbiological standards and specifications.

**BIO 4231: Principles of Epidemiology and Public Health (3 Credit Units)**

Statistical application to epidemiology; Nature of epidemiological investigation; Spectrum of infections; Hard immunity; Latency of infection; Multifactorial systems in epidemics. Zoonoses. Antigenic drifts; Biological products for immunization schedules; International control of infectious diseases

**MCB 4231 Agricultural Microbiology (2 Credit Units)**

A survey of microorganisms cause and control of plant disease: Mechanisms of microbial attack of plants; Microbiology of different plant parts; Identification; Diagnosis and control of phytopathogenic microbes in litter decomposition and soil fertility; Bio fertilization and nitrogen fixation; Detection and prevention of animal diseases in the tropics.

**MCB 4241: Bioremediation (3 Credit Units)**

Bioremediation; Microbial growth on, transformation and pollutants, e.g. hydrocarbon spills, etc protocols and analytical methodologies; Strategic monitoring requirement; Aerobic and anaerobic organism.

**MCB 4251: Petroleum Microbiology (3 Credit Units)**

Biogenesis of fossil fuels with emphasis on the role of microorganism; Petroleum prospecting and microbe-enhanced oil recovery; Microbial corrosion of pipelines, and rig structures and its control. Oil spills on microbial activities in aquatic arid, terrestrial ecosystem. Biodegradation of gasoline, aviation fuels, lubricants and cutting fluids; Biotransformation of hydrocarbons.

**MCB 4252: Microbial Ecology (2 Credit Units)**

Microbes and ecological theory; Physiological, morphological, and genetic adaptations of micro-organisms to their environment; Microbial interactions; Micro-organisms in ecosystems; Microbial bioconversion

**MCB 4222: Microbial Genetics (3 Credit Units)**

A survey of the current status of microbial genetics (bacterial, viral, protozoan -

and fungal) including discussion of methods and findings in the areas of mutations, isolation and biochemical characterization of mutants; Adaptation, transformation, transduction, conversion and conjugation; General and specialized methods and techniques in microbial genetics.

**BIO 4112: Immunology and immuno-chemistry (3 Credit Units)**

Basic concepts of immunology; Structure of antigens; determinants cellular response; genetic and responses to antigenetic stimulation; Structure and classification of immunoglobulin and antibodies; Mechanisms and theories of antibody formation; Antigen and antibody interactions; Role of Lymphoid tissues and thymus in immuno responses; Hypersensitivity, immuno-pathology, Immunoprophylaxis and serotherapy. Laboratory exercises in modern techniques in immunology and immuno-chemistry.

**MCB 4232: Pharmaceutical Microbiology (2 Credit Units)**

The chemistry and production of synthetic chemotherapeutic agents and antibiotics; Production and synthesis of antibiotics and antimicrobial agents; Quality control of pharmaceutical products; Concepts of growth and death in microorganisms; the mode of action and assay' of antimicrobial agents; Concepts of antibiotic sensitivity and resistance as related to microbial physiology; Mechanisms of drug resistance.

**MCB 4242: Food and Dairy Microbiology (2 Credit Units)**

The distribution, role and significance of microorganisms in food; factors that affect microbial growths in foods; Food spoilage and food-borne diseases; Food preservation techniques (including irradiation); Microbial indices of food quality; Food microbiological standards; Microbes as food; single cell protein.

**MCB 4122: Research Project (6 Credit Units)**

A research study shall be conducted by the student in the area of interest e.g. Plant Breeding, Plant Taxonomy, Ecology, Plant Physiology, Mycology, Plant Pathology, ethno botany, Paleobotany, etc and topics in the area of microbiology. It shall be carried out under the supervision of a competent academic staff. A written report (thesis) shall be presented at the end of the work.



**OKOI ENANG EFFIOM, PhD**  
**Ag. HOD**

