WESLEY UNIVERSITY ONDO

COLLEGE OF NATURAL AND APPLIED SCIENCES

PROSPECTUS

UNDERGRADUATE DEGREE PROGRAMMES

2022-2025

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FOREWORD

You are all welcome to the College of Natural and Applied Sciences, Wesley University Ondo. This is one of the premier Colleges in this University and had been a pace setter both in student enrolment and successful academic output since the inception of the University twelve years ago. Our philosophy is to continue to demonstrate excellence in all our programmes and to train and equip our students both academically and morally so that they end up excelling in their various fields.

This University is faith based and is expected that with godliness being your watchword you will be worthy in character and learning. The need to build more capacity in Natural and Applied Sciences is on the increase. The number of Industries and Institutions requiring professional expertise in the Sciences and related fields are vast across the nation. A commensurate increase in the number of qualified personnel is therefore essential.

The College awards degrees in six distinct programmes within three Departments namely

Department of Biological Sciences

- Microbiology
- Biochemistry

Department of Physical Sciences

- Industrial Chemistry
- Industrial Mathematics
- Geology

Department of Computer Sciences

- Computer Sciences

The various prgogramme have specialized and competent academic and non- academic manpower to ensure your success.

The College has adequate equipment and facilities for teaching and research in this programmes and if the need arises additional specialized and competent man power will be employed ensure the success of this programme. It is our desire to see that you graduate in flying colours from your programmes.

On behalf of the Management of the University I, again welcome you and enjoin you to take your academic carrier with the seriousness it demands.

Thank you.

Prof. E.A. Areo
Ag. Dean, College of Natural and Applied Sciences.

GENERAL INFORMATION

MISSION OF UNIVERSITY:

Wesley University Ondo, Ondo State Nigeria is dedicated to the training of its students to become professionally competent and confident graduates with exquisite dexterity. It provides enabling environment for effective teaching and research in cutting-edge disciplines of all human endeavours for sustainable development. Consequently, the curricular involve intensive teaching and extensive practical training in innovation technology. The University is faith-based and thus passionate about instilling moral regeneration and godly character through Christian faith into all students. The research objectives are also made to be relevant to the needs of industries that will ensure prompt delivery of well-tested and technically optimized protocols to sensitized and confident graduates; the training of self-reliant and competent graduates capable of working on their own instead of the current dependence on government employment constitute the focal points of the University.

Grading System

The University shall ensure the use of common assessment scale and grading system for all courses taught throughout the University. The grading system shall be as indicated in the table below:

Percentage Scores	Letter Grade	Quality Point	Level of Achievement
70 – 100	A	5	Excellent
60 – 69	B	4	Very good
50 – 59	C	3	Good
45 – 49	D	2	Satisfactory
40 – 44	E	1	Fair
0 - 39	F	0	Fail

Cumulative grade Point Average (CGPA) which is an important assessment parameter is used to determine the level of the final pass grade obtained by a student in all programmes in the university as follows:

Percentage Scores	Letter Grade
4.50 – 5.00	1st Class Honours
3.50 – 4.49	2nd Class Honours Upper Division
2.40 – 3.49	2nd Class Honours Lower Division
1.50 – 2.39	3rd Class Honours

Eligibility to write Examination

i. Only candidates who have registered for courses are eligible to take the Semester examinations.

ii. In order to qualify to sit for an examination, a student must have attended a minimum of 70% of the lectures.

i. To be qualified to take an examination, a student must have paid 100% of the prescribed fees at the beginning of the First Semester during the registration period. Any student that is unable to make full payment at the prescribed period must seek the approval of the Registrar for part-payment of the fees which may not be less than 50% of prescribed fees. Half payment should be made before the end of the period for late registration for the First Semester while full payment should be made before the end of registration for the Second Semester.

3.6 Academic Standing

3.6.1 Good Academic Standing

To be in good standing, a student must maintain a cumulative grade-point average (CGPA) of not less than 1.00 at the end of any session during his/her study in the University.

3.6.2 Probation

A student whose CGPA is below 1.00 at the end of a particular semester of study, goes on probation the following semester.

3.6.3 Withdrawal

A student would be required to withdraw from the University if:

(i) He/she maintains a Cumulative Grade Point Average (CGPA) that is **Below** 1.00 for two consecutive semesters.

(ii) He/she has spent the maximum period of study allowed for his/her programme of study and still has one or more courses outstanding.

3.7 Termination of Studentship

A student may have his/her studentship terminated and be required to withdraw from the University if he/she fails to register for the required minimum number of courses/units of instruction for two consecutive semesters without approval.

3.8 Semester Examination

Each course shall normally be completed and examined at the end of each semester in which it is offered. The examination shall be conducted as prescribed by Senate.

3.9 Dissatisfaction with Examination Result

i. A student who is dissatisfied with the result of an examination affecting him/her may request for a review by submission of an application to the Senate through the Principal Assistant Registrar (Academic) of the university within three (3) weeks of release of the said result.

ii. The Senate of the university has the full prerogative to, or not to, effect any amendment of the said result after the cross examination of it.

ii. Any student with frivolous, ill motivated or speculative complaint(s) on result(s) shall be sanctioned.

4.00 Transfer

Any student who seeks transfer from the university to another is free to do so. Request for transcript for this and any other relevant purpose should be directed to the Admission officer on fulfillment of every necessary requirement.

4.0 EXAMINATION REGULATIONS AND GUIDELINES

4.1 Appointment of Examiners

ii. University examiners for degree programmes shall be appointed by the Senate on the recommendation of the appropriate College Board through the Committee Deans and Directors.

iii. University examiners shall be appointed annually at the first meeting of Senate provided that subsequent additional appointments may be processed through the Committee of Deans and Directors.

4.2. Control of University examinations

i. The Senate shall have control and general direction of all university examinations and shall determine any matter relating to the organization of examinations.

ii. The Committee of Deans and Directors shall be responsible for the details of organization and administrative arrangements for university examinations.

iii. University examinations shall be conducted by Departmental Boards of Examiners appointed at the first meeting of Senate on the recommendation of the College Board.

iv. The Head of Department, as Chief examiner, shall make arrangements for the invigilation of examinations in the Department, while the General Studies Unit makes arrangement for the invigilation of compulsory Special Electives (CSC 111 & 112, GNS 111, 112, 113, 114, 211, 212, 213 and 214).

v. Each examination room shall have a minimum of two invigilators, one of whom shall be designated senior invigilator.

vi. Names of invigilators on all campuses for all examinations shall be forwarded to the Provosts of the Colleges and copies of such lists forwarded to the Registrar and Deputy Registrar, Academic Affairs.

4.3 Eligibility to write Examination

i. Only candidates who have registered for courses are eligible to take the Semester examinations.

ii. In order to qualify to sit for an examination, a student must have attended a minimum of 70% of the lectures.

iv. To be qualified to take an examination, a student must have paid 100% of the prescribed fees at the beginning of the First Semester during the registration period. Any student that is unable to make full payment at the prescribed period must seek the approval of the Registrar for part-payment of the fees which may not be less than 50% of prescribed fees. Half payment should be made before the end of the period for late registration for the First Semester while full payment should be made before the end of registration for the Second Semester.

4.4 Examination Time-Table

i. The Sub-Committee on Examination Time Table shall make available the Semester Teaching and Examination Time-Tables at the beginning of each semester to guide students in the selection of courses.

ii. The Academic Affairs Unit shall re-circulate the examination time-Table for all courses at least 4 weeks before the examination date to avail students the opportunity of submitting complaints on clashes. All clashes are submitted to the Head of Department who shall remit same to the Examination time-table committee.

iii. The final time-table shall be displayed on all notice-boards two weeks before the examination after which there shall be no adjustment without the permission of the Registrar.

iv. The time and venue for each examination shall be strictly adhered to and when it is absolutely necessary to rescheduled an examination, the Head of Department will do so after due consultation with the Provost and such a change shall be published giving the affected candidates a minimum of 48 hours' notice of the change.

4.5 Invigilation Arrangement

i. It is misconduct for an invigilator to arrive late to the venue of an examination. It is the responsibility of the Head of Department and Chief Examiner to ensure that all invigilators are aware of their responsibility.

ii. One hour before an examination, all examination hall shall be vacated and prepared for the examination. Candidates shall be checked into examination halls by invigilators who will determine the sitting arrangement of candidates.

iii. No student without an identity card will be allowed into an examination hall.

iv. Checking-in of candidates into the examination hall shall commence 30 minutes before commencement of an examination.

v. Candidates who arrive late shall not be allowed extra time except in special circumstances such as instances of unresolved clashes of which the candidate had duly notified the Chief Examiner in writing.

vi. In case a candidate has to leave the examination room temporarily, he shall be accompanied by an invigilator.

vii. Invigilators shall maintain vigilance throughout the examination period and at no time will an examination hall be without an invigilator.

viii. Until the time when candidates are allowed to leave the examination hall at the end of the examination, no copy of the examination question paper shall be removed from the examination hall. If for any reason a candidate has to leave the examination hall one or two hours into the examination for a three hour paper, he shall hand over both the answer script and examination question paper to the invigilator before leaving.

ix. Invigilators shall complete attendance sheets in duplicate and the signed sheets shall be considered as the final list of candidates in the examination. One copy will be forwarded to the Registrar while the other copy will be enclosed in the envelope containing the answer script.

x. At the end of an examination, candidates shall hand over their answer scripts to the invigilator who shall check the candidates' answer scripts against the attendance list to ensure that the scripts are complete. The invigilator shall then seal the envelope containing the answer scripts together with copies of the relevant question paper and a copy of the attendance sheets and deliver them to the Examination Officer.

xi. Where an examination malpractice is committed, the candidate involved shall be required to make a statement by completing the required examination malpractice form. The candidate shall however be allowed to complete the examination. Under no circumstances shall an invigilator seize a candidate's answer script, tear answer script or forcibly eject a candidate from an examination hall. Where a candidate's behavior constitutes a breach of the peace, the security official on duty shall intervene.

xii. Where a candidate falls ill in an examination hall, the invigilator shall contact the medical officer on duty for immediate medical attention. Telephone numbers of the security and medical personnel shall be made available to all invigilators.

xiii. Reports on all examination malpractices shall be sent to the Registrar by the Chief Invigilator. The Registrar shall forward such report to the Vice-Chancellor within 24 hours who in turn shall forward same to the disciplinary committee for thorough investigation and recommendations.

xiv. All cases of examination malpractices shall be concluded within two months of the conclusion of the semester examination.

xv. The signed report of the Central Examination Malpractices Investigation Panel be forwarded to the Vice-Chancellor who as chairman of Senate may take action and report same to Senate.

4.6 Absence from Examination

1. Any Student who fails to register for courses during the semester without permission shall be scored zero (0F) in 15 units which is the minimum number of units required for registration for full-timer students.

2. Candidates who registered for courses, attended classes, and took the required tests but failed to take the semester examination without permission should be given continuous assessment grade on each of the affected courses but a grade of zero (0) in the examination.

3. When a student falls ill before and examination, he is under obligation to send a medical report countersigned by the medical doctor of the university Health Centre not later than one week after the examination to the Chief Examiner. Cases of submission of medical reports outside this period shall be considered on their merit.

4. A candidate applying for leave of absence on medical grounds must forward his application through his head of Department to the College Board. The medical report must be countersigned by the medical doctor at the University Health Centre.

5. Absence from examination other than on medical grounds may be considered on its own merit.

6. A candidate who is permitted to discontinue with an examination by the medical officer on health grounds shall not be penalized and shall be allowed to take the examination at the next available opportunity.

4.7 Guidelines for the Procession of Results

1. Course Lecturers shall collect sealed package of answer scripts from the Examination Officer within 24 hours of completion of examination.

2. Computed grades must be submitted to the Departmental Examination Committee for consideration within two weeks after the completion of the last examination paper.

3. The Departmental Examination Committee comprising the following membership shall meet within three weeks after examination.
   a. Head of Department - Chairman
   b. University Examiners as approved by Senate for the Department.

4. The College Board shall meet to consider recommendations from the Departmental Examination Committee four (4) weeks after examinations.

5. The grades of students from other Departments including grade for Special Electives shall be forwarded through the Head of Department within two days of the meeting of the Departmental Examination Committee.

6. The Committee of Deans and Directors shall meet to consider the recommendations from the College Board which shall be presented by Heads of Departments and Departmental Examination Officers. Such meeting(s) shall be held within four weeks of the completion of the Semester Examination.

7. Matters arising shall be provided on all cases requiring explanation such as cases of students with no results in some or all courses, students with zero (F0) in some courses as well as students who registered for less than 15 Units and students who registered for less than 15 Units on leave of absence or with no registration information.

8. All presentations of results shall include the master mark sheet, reflecting grades, pass list by name, the summary of results and key to courses.

9. Semester results shall be ready for the consideration of Senate not later than six weeks after the completion of the last paper.

4.8 Examination Related Offences and Corresponding Penalties as approved by Senate

S/n	OFFENCES	PENALTIES
1.	Possession of examination answer booklet(s) prior to the examination	Suspension for one (1) Semester
2	Possession of valid question papers prior to the examination period (leakage)	Dismissal
3	Impersonation and hire of examination mercenaries	Dismissal
4	Smuggling out question paper while the examination is in progress	Zero (0F) in course + Suspension for two (2) Semester
5	Smuggling in prepared answers on handkerchief, examination stationery, part of the body, scraps of paper etc.	Zero (0F) in course + Suspension for two (2) Semester
6	Exchange of answer sheet between students	Zero (0F) in course + Suspension for two (2) Semester
7	Exchange of question papers on which answers have been written by students	Zero (0F) in course + Suspension for two (2) Semester
8	Copying from notes, scraps of papers, prepared answers textbooks, handsets and fellow students	Zero (0F) in course + Suspension for two (2) Semester
9	Possession of handsets in the examination hall	Suspension for two (1) Semester

10	Aiding, abetting and spying on another candidate during examination	Zero (0F) in course
11	Submission of answer script with different handwritings	Dismissal
12	Submission of script without student's registration on the attendance list	Zero (0F) in course
13	Refusal of students to submit answer script at the end of the examination	Zero (0F) in course + Suspension for two (1) Semester
14	Tampering with other students' answer scripts (mischievous handling, hiding, tearing etc	Zero (0F) in course + Suspension for two (2) Semester
15	Refusal to complete the examination malpractices form after involvement in malpractice	Zero (0F) in course + Suspension for two (2) Semester
16	Insubordination/failure to obey invigilators' instructions during examination	Zero (0F) in course+ Suspension for one (1) Semester
17	Refusal to appear before the Examination Malpractices Panel after two (2) invitations	Dismissal
18	Assault/battery/harassment of invigilators	Dismissal
19	Assault/battery/harassment of co-students for non-cooperation in examination malpractices	Dismissal
20	Sitting within a close range of a place where implicating material is found	Strong warning

5.0 DEPARTMENTAL ADMINISTRATION

5.1 General Administration of the Department/Programmes

The Head of Department directs and coordinates the academic and administrative activities of the Department and he/she is responsible to the Provost of the College. The Department disseminates information emanating from Senate, University and College Board meetings at Departmental meetings chaired by the Head of Department. Regular Departmental meetings are held to ensure that every staff member is part of the decision making process. At such meetings, decisions are taken and duties/responsibilities are shared among the members to ensure that the goals of the programmes and that of the Department are realized.

5.2 Students' Welfare

The welfare of students is of importance to the Department. Apart from the University Counseling Unit that handles cases requiring student counseling, the Department operates Staff/Students interactive forum where students are properly guided on all aspects of their academic development. Every student is also allocated a staff adviser, who handles all aspects of students' academic development. Students with complex cases bothering on emotional and physical problems are referred to the Students Affairs Unit of the University for Appropriate counseling while those that have health problems are handled by the University Health Centre. Indigent and brilliant students are also recommended to the appropriate University Committee for consideration for University scholarships.

5.3 Handling of Academic Grievances

The Department has in place a robust system of handling academic grievances of students. These students are required to contact the Head of Department and after initial counseling are advised to write officially through the Head of Department to appropriate units of the University. Apart from endorsing such letters, the HOD also monitors such students' requests to ensure appropriate responses from units concerned.

5.4 Student Academic Advising

At the beginning of every session, all students in the Department are attached to academic staff of the Department as Staff Advisers. The Staff Advisers are required to counsel the students on all aspect of their academic work including courses to be registered for, registration for carry over courses and attendance at lectures.

MICROBIOLOGY PROGRAMME

DEPARTMENT OF BIOLOGICAL SCIENCES

MICROBIOLOGY PROGRAMME

1.0 INTRODUCTION

The programme is structured in a way that it will equip students with theoretical and practical backgrounds in the areas of Microbiology leading to the award of Bachelor of Science (B.Sc.) degrees in Microbiology. The students at the end of graduation would have acquired requisite knowledge and skills in the field of Microbiology and biotechnology.

2.0 PROGRAMME PHILOSOPHY

The philosophy of this programme is to produce practically oriented graduates in line with the philosophy of the University. The programme trains graduates with broad based curriculum of the various aspects of Microbiology, to inculcate microbiological concepts and techniques into students geared towards solving mankind problems and for self-reliance

3.0 PROGRAMME OBJECTIVES

The objectives of the programmes are to:

(i) develop modern microbiological concepts and tools for enhanced service delivery in the industries and other science-based institutions, in order to meet global challenges;

(ii) build students capacity in basic and applied research methods, geared towards national development;

(iii) empower students in microbiological concepts for self-reliance.

4.0 ADMISSION REQUIREMENTS

At least five ordinary level credits in subjects which must include; English, Biology, Chemistry, Physics and Mathematics. JUPEB, Ordinary National Diploma (OND) in addition, to holders of Higher National Diploma (HND) may be considered for admission into 200 level, provided they meet the minimum entry requirements.

5.0 DURATION OF PROGRAMME

The program is for a duration of four years.

6.0 REQUIREMENT FOR GRADUATION

To be eligible for the degree of Bachelor of Science (B.Sc.) Honours in Microbiology, students must have:

(i) Passed all required courses recommended for specialization;

(ii) Accumulated required minimum credit units for the four year program.

8.0 COURSE CODE AND DESCRIPTION:

A three alphabets acronym is adapted to course code. These are BIO for Biology courses, BCH for Biochemistry courses and MIC for Microbiology courses. The number following the code is described thus: the first figure stands for level or year of study, the second figure indicates the semester in which the course is taught; odd numbers represents first (Harmattan) semester courses while even numbers represent the second (Rain) semester courses.

B. Sc. MICROBIOLOGY

100 LEVEL COURSES

FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS

BIO 111	General Biology I	3	C
BIO 117	General Biology Lab. I	1	C
CHM 111	General Chemistry I	3	R
CHM 113	General Chemistry Lab. I	1	R
CSC 111	Introduction to Computing Concepts	3	R
GNS 111	Use of English I	2	R
LIB 111	Use of Library	2	R
MAT 111	General Mathematics I	3	R
PHY 111	General Physics I	3	R
PHY 113	General Physics III	2	R
PHY 117	General Physics Lab. I	1	R
	TOTAL UNITS:	**24**	

SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
BIO 122	General Biology II	3	C
BIO 127	General Biology Lab. II	1	C
CHM 122	General Chemistry II	3	R
CHM 124	General Chemistry Lab. II	1	R
CSC 122	Introduction to Programming	3	R
GNS 121	Use of English II	2	R
GNS 122	Introduction to Philosophy and Logic	2	R
MAT 122	General Mathematics II	3	R
PHY 124	General Physics IV	2	R
PHY 128	General Physics Lab. II	1	R
	TOTAL UNITS:	**21**	

200 LEVEL COURSES

FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 211	General Biochemistry I	3	R
BCH 217	Introduction to Lab Biochemistry	1	R
BIO 211	Cell Biology	2	R
BIO 213	Invertebrate Zoology and Parasitology	3	R
BIO 214	Biosystematics and Varieties of Plants	2	R
CHM 211	Inorganic Chemistry I	3	R

GNS 212	Nigerian People and Culture	2	R
MIC 211	Introductory Microbiology I	3	C
MIC 217	Introduction to Lab Microbiology	1	C
	TOTAL UNITS:	**20**	

SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 221	Introductory Biochemistry II	3	R
BCH 227	General Biochemistry Lab 1	1	R
BIO 222	Biological Techniques	2	R
BIO 223	Introduction to Ethnobiology	2	R
BIO 224	Plant Physiology	2	R
CHM 222	Organic Chemistry I	3	R
ENT 121	Entrepreneurship Studies	2	R
GNS 211	Introduction to Entrepreneurship	2	R
MIC 222	Introductory Microbiology II	3	C
MIC 227	General Microbiology Lab I	1	C
	TOTAL UNITS:	**21**	

300 LEVEL COURSES

FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 317	Nutritional &Nutraceutical Biochemistry	2	R
BIO 311	Biostatiscs and Biometry	2	R
BIO 312	Genetics	2	R
ENT 311	Entrepreneurship Studies I	2	R
MIC 311	Bacteriology	2	C
MIC 312	Mycology	3	R
MIC 314	Soil Microbiology	2	R
MIC 315	Immunology	3	C
MIC 316	Animal and Plant Pathology	3	C
MIC 317	General Microbiology Lab II	1	C
	TOTAL UNITS:	**22**	

SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
MIC 321	SIWES Institutional and Industrial Based Supervisory Assessment	3	C
MIC 322	SIWES Technical Report	6	C
MIC 323	Post SIWES Seminar Presentation	3	C
MIC 324	Grading of SIWES Working Documents (Log Book and ITF Form 8)	3	C
	TOTAL UNITS:	**15**	

400 LEVEL COURSES

FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
MIC 411	Basic Virology	2	R
MIC 412	Food Microbiology	2	C
MIC 413	Agricultural Microbiology	2	C
MIC 414	Pathogenic Microbiology	2	C
MIC 415	Microbial Physiology and Metabolism	3	R
MIC 416	Microbial Genetics and Biotechnology	3	R
MIC 417	Industrial Microbiology	3	R
MIC 418	Analytical & Microbiological Quality Control	2	R
MIC 419	Microbial Ecology	2	R
	TOTAL UNITS:	**21**	

SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
BIO 420	Seminar in Biological Sciences	2	C
MIC 421	Medical Microbiology	2	C
MIC 422	Principles of Epidemiology and Public Health Management	2	R
MIC 423	Environmental Microbiology	2	C

MIC 424	Petroleum Microbiology	3	C
MIC 425	Pharmaceutical Microbiology	3	R
MIC426	Aquatic Microbiology	2	C
MIC 428	Research Project	6	C
	TOTAL UNITS:	**22**	

COURSE SYNOPSES

BIO 111: GENERAL BIOLOGY I (3 UNITS)

Cell structure and organisation: Functions of cellular organelles; Diversity: characteristics and classification of living things. General reproduction. Interrelationship of organisms; heredity and evolution; Elements of ecology and types of habitat. Scope of biology, differences between plants and animals. Variation and life cycles of plant to include non-vascular plants, like algae, fungi, bacteria, viruses, bryophytes and pteridophytes. Varieties and forms; cycles and functions of flowering plants.

BIO 117: GENERAL BIOLOGY LAB. I (1 UNIT)

Practical work and field trips to be based on cell structure and organisation: functions of cellular organelles; diversity, characteristics and classification of living things, general reproduction, interrelationship of organisms, heredity and evolution. Elements of ecology and types of habitat. Scope of biology, differences between plants and animals. Variation and life cycles of plants to include non-vascular plants, like algae, fungi, bacteria, viruses, bryophytes and pteridophytes. Varieties and forms; cycles and functions of flowering plants. Concept of safety in the biological laboratory. Safety precautions and use of microscopes.

BIO 122: GENERAL BIOLOGY II (3 UNITS)

A generalised survey of the plant and animal kingdoms based mainly on study of similarities and differences in external features; ecological adaptation of these forms. Structural, functional and evolutionary study of protozoan. Coelenterates, platyhelminthes, nematodes, annelids, arthropods. echinoderms and molluscs. Evolutionary sequence in the form and functions of protochordates and various classes of vertebrates. Introduction to ecology to include simple ecological facts in terrestrial and aquatic habitats and the relationships between organism and its environment.

BIO 127: GENERAL BIOLOGY LAB. II (1 UNIT)

Concept of hazard associated with reagents and symbols. Practical work and field trips to be based on, a generalised survey of the animal kingdom based mainly on study of similarities and differences in external features; ecological adaptation of these forms. Structural, functional and evolutionary studies of protozoa, coelenterates, platyhelminthes, nematodes, annelids, arthropods,

echinoderms and molluscs. Evolutionary sequence in the form and functions of protochordates and various classes of vertebrates. Introduction to ecology to include simple ecological facts in terrestrial and aquatic habitats and the relationships between an organism and its environment.

BIO 211: CELL BIOLOGY (2 UNITS)

Macromolecular basis of life. Cellular basis of biological organization. Modern concepts relating to the cell, structure and function of organelles. Cell communication. Stability of the differentiated state. The formation, distribution, structure and function of vertebrate tissues. The organization of tissues into systems. Energy production and utilization. Genetic inheritance and variation, information transfer, reproduction, embryogenesis and growth.

BIO 213: INVERTEBRATE ZOOLOGY AND PARASITOLOGY (3 UNITS)

A general study of classification, structure, function, mode of life and phylogenetic relationship of selected members of protozoa, cnidaria, platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata, the minor phyla, practical inclusive. Elementary knowledge and microscopic recognition of adult forms, ova, cysts and larvae of the following: malarial parasites, trypanosomes, *Dracucunlusmedinansis*, larva migrants, Loa loa, Onchocerca etc. Intestinal protozoa-*Entamoebahistolytica, Entamoeba coli, Balantidium coli, Girdia, Trichomonas* etc. *Taeniasolium, T. saginata*, Echinococchus etc. Trematodes such as *Schistosomahaematobium*, *S. mansonii*, *S. japonicum,Fasciolagigantica, F. hepatica* etc. Strongyloides. Nematodes such as *Ancylostoma,Trichuristrichuria*. Evolution of parasitic mode of life. Nature of parasitism in relation to other forms of animal associations. Host-parasite relationships. Epidemiological studies and control measures of importance. Tropical parasitc diseases and the role of vector in the transmission of these diseases.

BIO 214: BIOSYSTEMATICS AND VARIETIES OF PLANTS (2 UNITS)

The principle of taxonomy, the units of classification; the taxonomic hierarchy, methods used in assessing relationships, delimitation of taxa and attribution of rank. The concept of characters. A study of the history and concepts of animal taxonomy, theories and methods of classification and international code of nomenclature. Classification range of form and organization, life histories and representative members of viruses, bacteria, fungi, algae, bryophytes and pteridophytes. Morphology, ecology, life histories and embryology of some Gymnosperms and Angiosperms.

BIO 222: BIOLOGICAL TECHNIQUES (2 UNITS)

Microscope, preparation of microscope slides, biological drawings, microtomy, photometry, colorimetry, cytological techniques, chromatography, cytochemical techniques, conductometry, experimental design, scientific illustration. Collection and preservation of biological specimens. Herbarium techniques. Laboratory experiments on genetics and cell biology.

BIO 223: INTRODUCTION TO ETHNOBIOLOGY (2 UNITS)

Plants used by indigenous people of West Africa for treating human diseases. Description, identification and classification of medicinal plants. Ethno-veterinary medicine. Plants used as

dyes, food colours, preservatives, and pesticides. Wild edible fruits, collection, preservation and conservation techniques. Preparation of extracts from various organs of plants. Gathering of ethnomedical information. Collection and preservation of medicinal plants.

BIO 224: PLANT PHYSIOLOGY (2 UNITS)

Fundamentals of plant physiology with special reference to the physical and chemical properties of cells. Plant water relations, physiology of stomata mineral nutrition photosynthesis, glycolysis and respiration, chemistry of metabolic inhibitors. Growth and movements, growth regulation, enzymes reactions; physiological aspects of crop yield. Transport phenomena in plants, physiology of seasonal development, flowering and flowering hormones; dormancy, seed germination and senescence. Endogenous rhythms. Implications in plant technology.

BIO 311: BIOSTATISTICS AND BIOMETRY (2 UNITS)

Definition of population, parameter statistics and sample. Variables, frequency polygon, cumulative frequency, skewness and kurtosis, mean, mode and median. Covariance and probability. Regression and correlation analysis. Experimental design: complete randomized design (CRD) and randomized complete block design (RCBD). Test statistics: chi-square, t-test etc. Null hypothesis and alternative.

BIO 312: GENETICS (2 UNITS)

Principles governing the transmission of hereditary factors from parents to offsprings and in populations. Probability and tests of goodness of fit. Multiple alleles, gene action and expression; sex determination, chemical nature of the gene. Some genetic diseases/abnormalities and their mechanism of inheritance, e.g. Down syndrome, colour blindness. Population genetics. Gene and genotype frequency mutation, selection, migration and random drift, H.W. equilibrium theory.

BIO 420: SEMINAR IN BIOLOGICAL SCIENCES (2 UNITS)

Detailed literature search followed by presentation at a departmental Seminar of a scientific topic, which must have good microbiological or biotechnological relevance.

MIC 211: INTRODUCTORY MICROBIOLOGY I (3 UNITS)

Historical of the Science of Microbiology. Types of microorganisms – Bacteria, Viruses, Fungi, Rickettsiae, Chlamydia, protozoa, Algae, etc. Growth and reproduction of microorganisms. General characteristics of microorganisms. Sterilization and disinfection; Structure, ecology and reproduction of representative microbial genera. Cultivation of microorganisms. Isolation of bacteria, fungi, viruses, etc. Nutrition and biochemical activities of microorganisms. Growth and reproduction of microorganisms; phases of growth, direct and indirect methods of measuring microbial growth, Logarithmic representation of microbial populations with emphasis on generation time. Control of microorganisms by physical and chemical methods with emphasis on sterilization and disinfection. Economic importance of selected microbial groups. Microbial variation and heredity.

MIC 217: INTRODUCTION TO LABORATORY MICROBIOLOGY (1 UNIT)

Operation, safety and maintenance of equipment: autoclave, colony counter, pH meter, incubator shaker, compound microscope, inoculation chamber, laminar flow, inoculation needle, spirit lamp and petri dish canister. Microbiological media such as general purpose, selective, differential and fastidious media. Isolation of microorganisms from different samples and environment to prove that microorganisms are ubiquitous.

MIC 222: INTRODUCTORY MICROBIOLOGY II (3 UNITS)

Isolation, characterization and identification of microorganisms. Microbial taxonomy with emphasis on systemic classification. Applied areas of microbiology – Microbes and human diseases (Normal microbiota, infectious diseases, emerging infectious diseases). Microbes and human welfare (recycling of vital elements, sewage treatment, Bioremediation, microbial insecticides etc). Microorganisms and the environment. Bacterial cell structure and function. Genetic system of bacteria. Bacteriophages of plasmids. Microbial growth and metabolism. Biochemical reactions of microorganisms. Energy and nutrient harvesting. Metabolic diversity among microorganisms; photoautotrophs, chemoautotrophs. Introduction to viruses and immunology.

MIC 227: GENERAL MICROBIOLOGY LAB I (1 UNIT)

Stains and various staining techniques. Gram staining. Isolation of microorganisms from water, soil, food and drinks. Characterization and identification of protozoans, bacteria and fungi.

MIC 311: BACTERIOLOGY (2 UNITS)

Concepts and historical perspectives of Bacteriology. Gross morphology of bacterial cells. Structure of bacteria. Nutrition in bacteria. Bacterial growth. Bacterial classification. Pathogenic bacteria and diseasaes. Host parasite relationship in bacterial infection. Attributes of microbes that enable them to cause diseases (virulence factors, toxigenicity, invasiveness). Sources of transmission of infections. Methods of spread of infections. Koch's postulate; Methods of isolation of bacterial pathogens. Principles of laboratory investigation of clinical specimens, *Enterobacteriaceae, Vibrio cholera* and other *vibrios*, Streptococcal infections, *Neisseria meningitis* and *Neisseria gonorrhoeae* infections, *Corynebacteria* infections, *Listeria* infections, Anaerobic Gram positive Bacilli (*Clostridia*), *Bordetellapertusis, Brucella, Pasteurella, Yersini*a. Morphology, cultural characteristics, biochemical properties, serological characteristics, pathogenicity, diagnosis, treatment and control of these organisms.

MIC 312: MYCOLOGY (3 UNITS)

Structure, life cycle, physiology and classification of Fungi; fungi of economic importance; laboratory methods in Mycology; Pathology and immunology of superficial systemic mycoses and actinomycoses. Yeasts and yeast like fungi. Classification of yeasts. Nutrition and reproduction in yeast and yeast like fungi. Sexual and asexual reproductive processes in yeasts and moulds. Differences between yeasts and moulds. Microscopic examination, culture of and media requirements. Yeasts in industry. Pathogenic yeasts and yeast like fungi: *Candida* species, *Histoplasma*spp, *Coccidiomycesimmitis*, *Cryptococcus neoformis*. Diseases associated with these

species. Classification and biology of fungi. Nutrition and methods of reproduction. Different types of spore formation. The Phycomycetes, Ascomyctes, Basidiomycetes and Deutromycetes. The study of the genera *Aspergillus*, *Penicillium*, *Rhizopus*, *Mucor*, *Cephalosporum*. Fungi of medical importance-the dermatrophs namely: *Microsporum*, *Trichophyton*, *Epidermaphyton*, *Norcadia*spp etc.

MIC 314: SOIL MICROBIOLOGY (2 UNITS)

The characteristics of the soil environment. Microbial flora and fauna of soil. Microbial activities in soil. Nitrogen cycle, carbon cycle; Mineral transformation by microorganisms. Ecological relationship among the soil pathogens. Effects of pesticides on soil microorganisms. Biodegradation and biofuel generation. Biogeochemical cycles and mineral transformation. Effects of physical properties of soil on soil microorganisms. Microbiology of the rhizosphere.

MIC 315: IMMUNOLOGY (3 UNITS)

Introduction. Historical background. Innate and Acquired Immunity. Antigens. Antibodies; Structure and classification of immunoglobulins and antibodies. Cellular Immunity. Antigen and antibody interactions, Immunological tolerance and suppression. Surgical grafting. Complement system. Hypersensitivity. Auto immune diseases and immunodeficiency diseases. Immunopathology and transplantation immunology, Immunoprophylaxis and serotherapy. Diagnostic immunology.

MIC 316: ANIMAL AND PLANT PATHOLOGY (3 UNITS)

Principles and concepts in plant pathology; certain plant diseases with emphasis on those prevalent in Nigeria; diseases of agricultural and natural importance e.g potato late blight, barley scab, flax rust. The concept of disease; disease cycles, life cycles and infection cycles of pathogens. Geographical distribution of pathogens; their isolation, identification, morphology, life cycles, source of inoculums, and transmission. Host-pathogen relationship. Methods and theory of biological therapy and chemotherapy. Identification, life cycles and pathology of the common internal and external parasites of animals. Potential public health significance of the parasites of animals. Zoonoses. Respiratory infections. Mastitis. Endocrine disorders. Laminitis, Acidosis, Ketosis, disorders of the mineral metabolism.

MIC 317: GENERAL MICROBIOLOGY LAB II (1 UNIT)

Collection of biological samples such as blood, urine, faeces, and sputum, Conducting experiments with the use of animals and plants, Basic tests in medical microbiology such as Widal test, malaria parasites, Biopesticides and biofertilizers formulation, Basic practical work in Industrial and Agricultural Microbiology, DNA extraction and molecular techniques.

MIC 321: SIWES INSTITUTIONAL AND INDUSTRIAL BASED SUPERVISORY ASSESSMENT (3 UNITS)

This assessment is made up of two components; the first componentis the grading of the SIWES student by academic staff of the University that have been sent on an unannounced visit to the student on SIWES placement. The second component of the assessment is the grading by the immediate supervisor of the student in the industry or SIWES placement of the student. The cumulartive score of these two assessments will give rise to the final grade for the SIWES institutional and industrial based supervisory assessment.

MIC 322: SIWES TECHNICAL REPORT (6 UNITS)

The scientific technical report written by students at the end of the program and assessed by two academic staff in that discipline will give rise to the final score for the SIWES technical report. This report must reflect high similarity index to the course of study of the student concerned.

MIC 323: POST SIWES SEMINAR PRESENTATION (3 UNITS)

This is the cumulative score of the oral seminar that will be presented by students at the end of the SIWES program. The various components of the seminar presentation should include corporate appearance, legibility of slides, sound technical knowledge of the field of study, and students' ability to answer questions at the end of the seminar.

MIC 324: GRADING OF SIWES WORKING DOCUMENTS (LOG BOOK AND ITF FORM 8) (3 UNITS)

The SIWES working document to be graded are log book, and the industrial training fund end of programme report (ITF Form 8). The technical content of the log book for twenty four weeks of the programme will be graded, also the three sections of the ITF form 8 should equally be graded. The cumulative mark from these twoworking documents will give the final score for the grading of the SIWES working document.

MIC 411: BASIC VIROLOGY (2 UNITS)

Historical background and development of Virology. Structure and composition of viruses; classification, cultivation, isolation, purification and identification of viruses. Mechanisms of viral replication and infection. Plant, Animal and Bacterial viruses. Regulation of lytic development and maintenance of the lysogenic state in bacteriophages lambda, P2 and l4 single stranded DNA and RNA phage viroids as pathogens. Chemotherapy of viral diseases. Antiviral agents such as interferons. Viruses and cancer (RNA/DNA oncogenic viruses). Latent/Persistent viral infections. Modern techniques in virology; elctromicroscopy, serology, electrophoresis, genomic detection; PCR, RF-PCR e.t.c.

MIC 412: FOOD MICROBIOLOGY (2 UNITS)

The distribution, role and significance of microorganisms in food. Intrinsic and extrinsic parameters of foods that affect microbial growth. Food spoilage and food-borne diseases. Food sanitation and

microbiological food quality control. Diseases of animals transmittable to man via food products. Methods of detecting the presence of microbes in foods. Effects of microbial growth on food-fermentation. Exploitation of microorganisms in novel processes for the production of fermented food with special focus on African fermented food products; techniques of processing and preservation of fermented foods with regard to their physio-chemical properties. Canning; outline of canning operations; principal spoilage organisms in canned foods; use of radiation in food preservation; insect contamination as spoilage organisms; laboratory examination of canned foods; method of detecting contaminants in foods. Recent developments in food Microbiology.

MIC 413: AGRICULTURAL MICROBIOLOGY (2 UNITS)

A survey of microorganisms involved in the cause and control of plant diseases. Mechanisms of microbial attack of plants. Microbiology of different plant parts. Identification, diagnosis and control of phytopathogenic viruses and viroids. Role of microbes in litter decomposition and soil fertility, biofertilization, mineralization and nitrogen fixation. Detection and prevention of animal diseases in the tropics.

MIC 414: PATHOGENIC MICROBIOLOGY (2 UNITS)

Study of some microbial pathogens of plants and animals with emphasis on those prevalent in Nigeria. The geographical distribution, isolation, identification, morphology, life cycle, source of infection, transmission and the host. Etiology, clinical manifestations of specific bacterial, viral and fungal pathogens of man. Control and prevention of of selected infections; viral, bacteria and fungal diseases of man especially those prevalent in Africa. Diagnosis and tracking of infectious diseases with special focus on those prevalent in Africa; Microbial diseases transmitted from one person to another (Air-borne, direct contact and sexually transmitted infections); Vector-borne and soil-borne, food-borne and water-borne microbial diseases.

MIC 415: MICROBIAL PHYSIOLOGY AND METABOLISM (3 UNITS)

A revision of cell structures and functions of various microorganisms; Nutrition and Energy metabolism of microorganisms. Classification of microorganisms based on nutrition in relation to their metabolism. Dynamics of microbial growth. Effect of physical and chemical factors on growth. Metabolism of food substances (Carbohydrate, protein, fat etc). Biosynthesis of microbial products. Biochemistry of various microbial processes such as transport, regulation and respiration; Energy flow in microbial metabolism: Substrate level phosphorylation and Electron transport phosphorylation.

MIC 416: MICROBIAL GENETICS AND BIOTECHNOLOGY (3 UNITS)

Survey of the current status of microbial genetics (Bacteria, Fungi, viruses and protozoa). Definitions and importance of biotechnology. History of biotechnology; traditional and modern botechnology. Principles and applications of biotechnology. Plasmids and transposable genetic

elements, mutagenesis and DNA repairs, bacteriophages genetics and genetics of Nitrogen fixation. Mechanism and nature of mutation, induction, isolation and characterization of mutants. Genetic recombination in prokaryotes including transformation, transduction, phage conversion and conjugation. Implications of molecular biology, including ethical and social controversies. Recent techniques in microbial genetics. Microbial biotechnology, biofuels, cloning, agricultural biotechnology, bioremediation, medical biotechnology, DNA fingerprinting and forensics. Chemical coding and expression of genetic information. Experiments with virulent phages, temperate phages and lysogenic bacteria Fungal genetics. Principles and applications of genetic engineering.

MIC 417: INDUSTRIAL MICROBIOLOGY (3 UNITS)

Fermentation systems; design and use of fermenters. Microorganisms of industrial importance. Classification of microbial products by use. Relationship between primary and secondary metabolism; characteristics, sources and strain improvement of industrial microorganisms. Microbial growth and product formation in industrial processes; media for industrial fermentations. Foaming, major products of industrial microbiology; Principles and practice involved in large scale utilization of microorganisms for production of foods, beverages, vitamins, amino acids, antibiotics, organic acids, beer, wine, pharmaceuticals, and chemicals; Enzyme production, and immobilization. Improvement of microbial strains , including recent advances such as genetic engineering. Use of defined mixed and continuous cultures in industrial fermentations, microbial deterioration of industrial materials.

MIC 418: ANALYTICAL AND MICROBIOLOGICAL QUALITY CONTROL

(2 UNITS)

Analytical and quality control measures in food and pharmaceutical industries, Microorganisms as reagents in quantitative analysis. Selection of microorganisms for assay (antibiotics, amino acids, vitamins etc), responses of microorganisms used in assays; Obtaining and measuring the response of microorganisms used in assays; Preparation of assay samples; methods of assay; interpretations of results. Microbiological quality assurance; A theoretical consideration of the management of microbiological quality assurance. HACCP, cleaning and sanitation. Microbiological specifications and regulations. Local and international approaches to obtaining safe food. Management and quality assurance in the microbiology laboratory.

MIC 419: MICROBIAL ECOLOGY (2 UNITS)

Microbes and ecological theory. Physiological, morphological and genetic adaptations of microorganisms to their environment. Microbial interactions; Microorganisms in natural ecosystems. Importance of microbes in the ecosystem. The life of microorganisms in air, springs, rivers, lakes and seas. Microbial bioconversions; the use of advanced molecular techniques to study ecology, Ecological evolutionary factors that influence the genetic structure of population of bacteria, fungi, plants and animals.

MIC 421: MEDICAL MICROBIOLOGY (2 UNITS)

The bacterial cell wall; Gram positive/negative cell wall, staining, peptidoglycan, lipopolysaccharides, and targets of antibiotics. Bacterial cell wall structure and genetic makeup of bacteria (Bacterial appendages, Bacterial spores, capsules, Ribosome, plasmid, Chromosome); their roles in pathogenesis or drug resistance. Genetic material of bacteria; Chromosomes, plasmids, transposable element, and phage genome. Mechanisms of transfer and recombination of bacterial genes; Transformation, transduction, conjugation and lysogenic conversion; Gene mutation. The significance of bacteria genetic variation (in drug resistance, pathogenesis or virulence and variation, diagnosis and vaccination), and manipulation of cloned DNA. Bacterial infection and pathogenesis; Normal human microbiota (Role of the resident microbiota and locations in the human body). Virulence of bacteria, bacteria virulence factors and their regulation (exotoxin, endotoxin, and their contribution to pathogenesis). Infection process; development and outcomes. Antimicrobial chemotherapies and their targets. Drug resistance. Diagnostic medical microbiology; sample collection, culture, identification, rapid diagnosis, immunological or molecular diagnostic tests. Prevention of bacteria infection; active immunization, vaccines, and passive immunization. Specific bacteria pathogens and the disease they cause; *Staphylococcus, Streptococcus, Neisseria, Enterobacteriaceae* (*Escherichia, Klebsiella, Enterobacter, Proteus, Salmonella, and Shigella*). *Pseudomonas, Mycobacteria, Brucella, Haemophilus*sp*., Treponema, Legionella, Chlamydia,* and Mycoplasmas. Major medically important fungi and associated diseases. Mechanisms of viral pathogenesis; viral infection and transmission. Viral pathogenesis, forms of viral infection, Characteristics of chronic and latent virus infections. Diagnosis, prevention and treatment of viral infection.

MIC 422: PRINCIPLES OF EPIDEMIOLOGY AND PUBLIC HEALTH MICROBIOLOGY (2 UNITS)

Introduction to public health concepts and practice. Basic concepts of epidemiology. Biostatistical applications in epidemiology. Nature of epidemiological investigations. Spectrum of infections. Herd immunity. Latency of infections. Multifactorial systems in epidemics. Zoonoses. Antigenic drifts. Biological products for immunization. Schedules for International control of infectious diseases.

MIC 423: ENVIRONMENTAL MICROBIOLOGY (2 UNITS)

Overview of microorganisms in the environment. Environmental Impact Assessment, Ecology of microorganisms in fresh water. Polluted water, air and soil. Pollution and self-purification of water; water purification. Brief studies of marine microbiology. Disease transmission by water; microbiological examinations of water; Microbiology of waste disposal; microorganisms important in sewage systems and waste waters; Biological oxygen demand and chemical oxygen demand. Waste disposal and management. Methods of municipal water and sewage treatment with emphasis on the activities of specific microorganisms involved. Disease transmission by water. Biodegradation of pollutants and recalcitrants.

MIC 424: PETROLEUM MICROBIOLOGY (3 UNITS)

Morphology and biostratography of major groups of microfossil. Biological origin and accumulation of petroleum and sedimentary basins; Biogenesis of fossil fuels with emphasis on the role of microorganisms. Microbial indicators in oil prospecting. Tertiary recovery of oil by means of microorganisms. Microbial degradation of petroleum products and use of microorganisms in oil clean-up operations in aquatic and terrestrial ecosystems. Oil spillage. Hydrocarbonoclastic bacteria; Role of microorganisms in corrosion of pipes and oil field equipment; metallomonas bacteria that cause rusting of oil pipes. Methanogenesis and methanotrophy. Effects of oil spillage on microbial activities in aquatic and terrestrial ecosystems. Biodeterioration and biotransformation of hydrocarbons.

MIC 425: PHARMACEUTICAL MICROBIOLOGY (3 UNITS)

Historical perspective of pharmaceutical microbiology .Concepts of growth and death in microorganisms. The chemistry of synthetic chemotherapeutic agents and antibiotics. Production and synthesis of antibiotics and antiseptics. Relationship of antimicrobial agents to different microbial groups: Gram positives, Gram negatives, spore formers etc. The mode of action and assay of antibiotics and antiseptics. Sensitivity and resistance as related to microbial physiology. Microbiological quality control in the pharmaceutical industry.

MIC 426: AQUATIC MICROBIOLOGY (2 UNITS)

Nature of aquatic environment; Microbiology of water supply, microbial flora of surface and ground waters; water treatment; water supply and public health. Conventional and advanced water treatment in hot climates and the use of water in agricultural irrigation, fish culture, industry and for municipal purposes; Sewage and sewage disposal in hot climates; Microbial aspect of water management; Eutrophication and bioremediation; Evolution, ecology and diversity of the marine environment; Origin of life in the sea and the evolutionary patterns suggested by the marine fossil beds; Major marine environment such as coral reefs, the deep sea floor, hydrothermal vents, the open ocean and the rotated zones; Diversity of plants and animals in each environment and the adaptations they have to vastly different conditions

MIC 428: RESEARCH PROJECT (6 UNITS)

A research project and dissertation to be undertaken on any topic of microbiological and/or biotechnological interest. The student will carry out a research on current trends in the field of microbiology and/or biotechnology under the guidance of an academic staff within the Department. A dissertation is expected to be written, which be orally examined by a panel of examiners headed by an external examiner.

ACADEMIC STAFF LIST

S/N	NAME	AREA OF SPECIALIZATION	QUALIFICATIONS	DESIGNATION	APPOINTMENT
1.	Prof. Olu Odeyemi	Microbiology	B.Sc, M.Sc, Ph. D (Microbiology)	Professor	Adjunct
2.	Prof. O.E. Fagade	Microbiology	B.Sc, M.Sc, Ph. D (Microbiology)	Professor	Adjunct
4.	Dr. E. O. Oyekanmi	Plant Pathology/Environmental Microbiology	B.Sc, M.Sc (Microbiology), Ph.D (Plant Pathology)	Associate Professor	Full-Time
5.	Dr. O. O. Bello	Medical Microbiology	B.Sc, M.Sc, Ph.D (Microbiology)	Senior Lecturer	Full-Time
6.	Dr. K. C. Komolafe	Biochemistry	B.Sc, M.Sc, Ph.D (Biochemistry)	Senior Lecturer	Adjunct
7.	Dr. J. Omololu-Aso	Microbiology	B.Sc, M.Sc, Ph.D (Microbiology)	Senior Lecturer	Adjunct
8.	Dr. B. A. Kelly	Environmental Microbiology	B.Sc, M.Sc (Microbiology)	Lecturer II	Full-Time
10.	Dr. O. T. Amoo	Industrial Microbiology	B.Sc, M.Sc (Microbiology)	Lecturer II	Full-Time
11.	Mr. Funmi Olatunjoye	Pharmaceutical Microbiology	B.Sc, M.Sc (Microbiology)	Assistant Lecturer	Full-Time
12.	Mr. Emmanuel Ehinmitan	Biotechnology	B.Sc, M.Sc (Microbiology)	Assistant Lecturer	Full-Time

13.	Miss O.E. Omoseyin	Microbiology	B.Sc, M.Sc (Microbiology)	Graduate Assitance	Full-Time

TECHNICAL STAFF LIST

S/N	NAME	QUALIFICATION	DESIGNATION	APPOINTMENT
1.	Mr. I. A. Adelakun	HND- Registered Technologist	Senior Technologist	Adjunct
4.	Mrs. A. Raji	B.Sc, M.Sc	Curator I	Full-Time
5.	Mrs. F. Olatunji	B.Sc	Curator II	Full-Time
6.	Mr. O. F. Ogundipe	B.Sc	Lab. Scientist	Full-Time
7.	Mr. Saviour Idiongsit	HND	Technologist II	Full-Time

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	DESIGNATION	APPOINTMENT
1.	Mrs. Funbi Richards	HND	Personal Secretary I	Full-Time

BIOCHEMISTRY PROGRAMME

1.0 Introduction

Biochemistry is a programme in the Biological Sciences Department and it is one of the core disciplines in the Basic medical sciences, which involves the study of the chemical processes that go on in living matter, ranging from viruses and bacteria to plant and animals. It is very essential to modern medicine and all Industrial processes.

The programme is broad based, enabling students to acquire sound knowledge in all branches of biochemistry as it satisfies the National University Commission (NUC) minimum standard requirements. Hence, students who successfully complete the degree programme should be well equipped to fit into various careers at national and international levels. They can also pursue higher degree studies, work in appropriate Research and Academic Institutions, Industrial, Medical, Pharmaceutical, Food and beverages establishments and in the field of Environmental management.

2.0 Philosophy and objectives of the Programme

The philosophy of this programme is to produce practically oriented graduates in line with the philosophy of the University. The programme trains graduates with broad based curriculum of the various aspects of Biochemistry, to solve mankind problem and inculcate scientific idea geared towards self-reliance.

Objectives:

The main objectives of this degree programme in biochemistry are to:

a. provide students with a broad and balanced foundation of biochemical knowledge and practical skills

b. develop in students the ability to apply knowledge and skills to solving theoretical and practical problems in biochemistry

c. inculcate in students, a range of transferable skills that are of value in biochemical and non-biochemical employment

d. equip students with knowledge and skills base from which they can proceed to further studies in specialised areas of biochemistry or multi-disciplinary areas involving biochemistry

e. provide, through training and orientation, an appreciation of the rewards of inter- and multi-disciplinary approach to the solution of complex life problems

f. generate in students an appreciation of the importance of biochemistry in industrial, economic, environmental, technological and social development

g. To instil in students a sense of enthusiasm for biochemistry, an appreciation of its application in different contexts and to involve them in an intellectually stimulating and satisfying experience of learning and studying.

2.0 Course List and Synopsis

100 Level Courses

First Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BIO 111	General Biology I	3	C
BIO 117	General Biology Lab I	1	C
CHM 111	General Chemistry I	3	C
CHM 113	General Chemistry Lab I	1	C
PHY 111	General Physics I	3	C
PHY 117	General Physics Lab I	1	C
PHY 113	General Physics III	2	C
MAT 111	Introductory Mathematics I	3	C
CSC 111	Introduction to Computing Concepts	3	C
GNS 111	Use of English I	2	C
LIB 111	Use of Library	2	C
	TOTAL NO OF UNITS	**24**	

Second Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BIO 122	General Biology II	3	C
BIO 127	General Biology Lab II	1	C
CHM 122	General Chemistry II	3	C
CHM 124	General Chemistry Lab II	1	C
PHY 124	General Physics IV	2	C
PHY 128	General Physics Lab II	1	C
MAT 122	General Mathematics II	3	C
CSC 122	Introduction to Programming	3	C
GNS 121	Use of English II	2	C
GNS 122	Introduction to Philosophy and Logic	2	C
	TOTAL NO OF UNITS	**21**	

200 Level Courses

First Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 211	General Biochemistry I	3	C
BCH 217	Introduction to Lab Biochemistry	1	C
BIO 211	Cell Biology	2	C
CHM 211	Inorganic Chemistry I	2	R
CHM 213	Physical Chemistry I	3	R
CHM 219	Experimental Inorganic Chemistry	1	R
GNS 212	Nigeria People and Culture	2	C
MAT 211	Mathematical Methods	3	R
MIC 211	Introductory Microbiology I	3	R
MIC 217	Introduction to Lab Microbiology	1	R
	TOTAL NO OF UNITS	**21**	

Second Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 221	General Biochemistry II	3	C
BCH 227	General Biochemistry Lab I	1	C
BIO 222	Biological Techniques	2	C
CHM 222	Organic Chemistry I	3	C
CHM 224	Analytical Chemistry	2	R
CHM 229	Experimental Organic Chemistry	1	R
ENT 121	Entrepreneurship Studies	2	C
MAT 123	Statistics for Sciences	4	C
MIC 222	Introductory Microbiology II	3	R
MIC 227	General Microbiology Lab I	1	R
	TOTAL NO OF UNITS	**22**	

300 Level Courses

First Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 310	Enzymology	3	C
BCH 311	Chemistry and metabolism of Amino acid and Proteins	3	C
BCH 312	Metabolism of Nucleic acids	2	C
BCH 313	Metabolism of Lipids	3	R
BCH 314	Carbohydrate Metabolism	3	R
BCH 315	Nutritional and Nutraceutical Biochemistry	3	R
BCH 316	Methods in Biochemistry	2	C
BCH 317	General Biochemistry Lab II	1	C
ENT 311	Entrepreneurship Studies I	2	C
	TOTAL NO OF UNITS	**22**	

Second Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 320	SIWES Institutional and Industry based Supervisory assessment	3	C
BCH 321	SIWES Technical Report	6	C
BCH 322	Post SIWES Seminar Presentation	3	C
BCH 323	Grading of SIWES Working documents (LOG Book and ITF Form 8)	3	C
	TOTAL NO OF UNITS	**15**	

400 Level Courses

First Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 410	Advanced Enzymology	2	C
BCH 411	Biochemical Toxicology	3	C
BCH 412	Plant Biochemistry	2	R
BCH 413	Principles of Molecular Biology and Genetic Engineering	3	C
BCH 414	Bioenergetics	2	C
BCH 415	Biochemical Reasoning	1	R
BCH 416	Immunochemistry	2	R
BCH 417	Advanced Biochemical Methods	2	C
BCH 418	Membrane Biochemistry	2	R
BCH 419	Industrial and Process Biochemistry	3	R
	TOTAL NO OF UNITS	**22**	

Second Semester

COURSE CODE	COURSE TITLE	UNITS	STATUS
BCH 420	Endocrinology	2	R
BCH 421	Advanced Biotechnology	3	C
BCH 422	Pharmacological Biochemistry	2	C
BCH 423	Tissue Biochemistry	2	R
BCH 424	Clinical and Forensic Biochemistry	3	R
BCH 425	Bio-Inorganic Chemistry	2	R
BCH 426	Seminar in Biochemistry	2	R
BCH 427	Research Project	6	C
	TOTAL NO OF UNITS	**22**	

COURSE SYNOPSIS

COURSE CODE	COURSE TITLE AND DESCRIPTION	UNITS
	200 LEVEL	
BCH 211	**GENERAL BIOCHEMISTRY 1** Chemistry of amino acids, protein and their derivatives; Chemistry and structure of carbohydrates: Monosaccharides and disaccharides, polysaccharides and proteoglycans; Glycoproteins and glycolipids. Analysis of carbohydrates. A survey of biochemical catalysts, enzymes and coenzymes; their nature, properties, characteristics including enzyme kinetics. Method of isolation and identification of enzymes. Enzyme markers.	**3**
BCH 217	**INTRODUCTION TO LAB BIOCHEMISTRY** Introduction to the laboratory and laboratory equipment. Safety, housekeeping, washing and drying of glassware in the laboratory. Accuracy of measurement and transfer of liquids and solids. Introduction to photometry and colorimetry; standard curve and absorption; pH and buffer systems. Qualitative and quantitative tests for amino acids and proteins. Biuret method and the separation of proteins	**1**
BCH 221	**GENERAL BIOCHEMISTRY II** Alkalinity and acidity, pH and pKa values and their effects on cellular activities; Buffers. Chemistry/structure of lipids and nucleic acids, nomenclature of nucleosides and nucleotides; effects of acid and alkali on hydrolysis of nucleic acid. Anabolic, catabolic and amphibolic pathways.	**3**
BCH 227	**GENERAL BIOCHEMISTRY LAB I** Programmed texts in concentration. Reactions of carbohydrates; thin layer chromatographic separation of sugars. Estimation of glucose in biological fluids (blood and urine). Analysis of lipids for double bonds and free fatty acids; separation by thin layer chromatography. Separation and purification of nucleic acids; estimation of DNA, RNA, phosphates and titratable acidity.	**1**
	300 LEVEL	
BCH 310	**ENZYMOLOGY** Classification and nomenclature of enzymes, mechanism of enzyme catalysed reaction. Effect of temperature, pH, ions and inhibitors on enzymes. Active sites of enzymes. Estimation of kinetic parameters- enzyme activities, K_m, V_{max}, K_ie.t.c. Production, isolation, purification and characterization of enzymes, vitamins and coenzymes. (Pre-requisite to BCH 410)	**3**

BCH 311	**CHEMISTRY AND METABOLISM OF AMINO ACID AND PROTEINS** Amino acids as building blocks of proteins. Oxidative degradation of amino acids and metabolism of carbon units. Biosynthesis of amino acids and some derivatives, the urea cycle, metabolism of inorganic nitrogen, disorders of amino acid metabolism and its regulation. Classification of proteins with examples from important groups. Isolation and characterization of proteins. Criteria for purity. Determination of shape and size of the protein molecule primary structure. Reactions of amino side chains, evolutionary aspects of amino acid sequences. Secondary, tertiary and quaternary structures of proteins. Protein-protein interaction, correlation of structure with function.	**3**
BCH 312	**METABOLISM OF NUCLEIC ACIDS** Occurrence, isolation, characterization and structure of nucleic acids. Genome organisation and biosynthesis. Metabolism of Purines and Pyrimidines. Nucleoside and nucleotides; Nucleic acid regulation. Abnormality in nucleic acid metabolism, xeroderma, pigmentation and skin cancers.	**2**
BCH 313	**METABOLISM OF LIPIDS** Classification of Lipids, Fatty acids, triglycerides, glycosylaglycerols, phospholipids, waxes prostaglandins. Lipid micelles, monolayers and bilayers. Lipoproteins, oxidation and synthesis of fatty acids, biosynthesis of lipids, phospholipids and sphingolipids, unsaturated and essential fatty acid, cholesterol synthesis. Formation of ketone bodies. Integration of lipid metabolism. Acetic acid as central precursor for biosynthesis of lipids. Methods of extraction and purification of lipids. Structure determination. Metabolism of phospholipids and glycolipids. Calmodulin in lipid metabolisms. Distribution, function, clinical application and biosynthesis of glycolipids; leucotrienes; prostaglandins and thromboxanes.	**3**
BCH 314	**CARBOHYDRATE METABOLISM** Degradation and digestion of carbohydrates-sugars, storage polysaccharides and cell walls. Reactions of sugars, glycolysis, the Tricarboxylic acid cycle, the phosphogluconate pathway, the glyoxylate pathway. The pentose phosphate pathway, Cori cycle and Calvin pathway. Gluconeogenesis, Disorders of carbohydrate metabolism, Regulation of carbohydrate metabolism.	**3**
BCH 315	**NUTRITIONAL AND NUTRACEUTICAL BIOCHEMISTRY** Body composition. Nutrients required by man and factors affecting the requirements. Foodstuff and their energy values and protein quality. Food	**3**

	processing and preservation. Consequences of excess and inadequate calorie intake, protein energy malnutrition. The vitamins; chemistry, metabolism and function. The minerals; metabolism and function. Animal and microbial nutrition. Feed formulation, food toxicants and detoxification mechanisms. Nutraceuticals; history, classification, scope and some marketed products.	
BCH 316	**METHODS IN BIOCHEMISTRY** Principles of instrumentation; principles, methodologies and applications of electrophoresis, chromatography (paper, liquid and gas), thin-layer chromatography, spectroscopy and spectro-photometry, centrifugation and isotopic techniques. Other separation methods; solvent extraction, ion-exchange, HPLC.	**2**
BCH 317	**GENERAL BIOCHEMISTRY LAB 2** Buffer preparation and pH measurement. Qualitative estimation of reducing sugars and determination of saponification number. Xanthine oxidase from milk and substrate specificity. Extraction and estimation of carotene. Iodine value and estimation of amino acids and proteins. Enzyme assays and kinetics properties of sucrase and determination of the equilibrium constant and standard free energy of phosphoglucomutase. Determination of serum LDH and isolation and characterization of RNA.	**1**
BCH 320	**SIWES Institutional and Industry based Supervisory assessment** This assessment is made up of two components; the first component is the grading of the SIWES student's by academic staff of the University that have been sent on an unannounced visit to the students on SIWES placement. The second component of the assessment is the grading by the immediate supervisor of the student's in the industry or his/her SIWES placement. The cumulative score of these two assessments will give rise to the final grade for the SIWES institutional and industry based supervisory assessment.	**3**
BCH 321	**SIWES Technical Report** The scientific technical report written by students at the end of the programme and assessed by two academic staff in that discipline will give rise to the final score for the SIWES technical report. This report must reflect high similarity index to the course of study of the student concerned.	**6**
BCH 322	**Post SIWES Seminar Presentation** This is the cumulative score of the oral seminar that will be presented by students at the end of the SIWES programme. The various components of the seminar presentation should include corporate appearance, legibility of slides,	**3**

	sound technical knowledge of the field of study, and students' ability to answer questions at the end of the seminar.	
BCH 323	**Grading of SIWES Working documents (LOG Book and ITF Form 8)** The SIWES working document to be graded are log book, and the Industrial Training Fund end of programme report (ITF Form 8). The technical content of the log book for twenty four weeks of the programme will be graded, also the three sections of the ITF form 8 should equally be graded. The cumulative mark from these two working documents will give the final score for the grading of the SIWES working document.	**2**
	400 LEVEL	
BCH 410	**ADVANCED ENZYMOLOGY** Steady state enzyme kinetics. Transient kinetic methods. Chemistry of enzyme catalysis. Regulatory enzymes. Molecular modes for allosterism. Multienzyme complexes. Enzyme assays. Criteria for determining purity of enzymes. Enzyme reconstitution. Regulation of enzyme activities and synthesis. Recent advances in enzymology.	**2**
BCH 411	**BIOCHEMICAL TOXICOLOGY** Biochemical toxicology: definition and scope; absorption and distribution; toxicokinetics; toxicant-receptor interactions; metabolism of toxicants; enzymatic basis of detoxication, physiological factors affecting metabolism of xenobiotics; elimination of toxicants and their metabolites; genetic poisons; resistance and tolerance to toxicants; natural toxins; drug metabolite isolation and structural identification; biochemical modes of action of pesticides; chemical carcinogenesis, trace elements toxicity, hepato-toxicity.	**3**
BCH 412	**PLANT BIOCHEMISTRY** Organisation of plant cells. Photosynthesis. Plant secondary metabolites: alkaloids and flavonoids, plant hormones, biosynthesis of carotenoid pigments, Biochemistry of plant development. The plant cell wall structure, formation and growth, lignin formation. Free amino acids, pyrimidines, purines and nucleosides in plants. Metabolism of auxins, gibberellins and cytokinins. Synthetic growth regulators and herbicides. Structure function relationship of plant hormones.	**2**
BCH 413	**PRINCIPLES OF MOLECULAR BIOLOGY AND GENETIC ENGINEERING** Structure of eukaryotic genome. Replication, transcription and translation a brief review. The genetic code and its relationship to cellular functions. DNA replication in a cell-free system (prokaryotic and eukaryotic systems). Gene	**3**

	organization. DNA sequencing. Genetic transformation, transduction and conjugation. Gene mutation, mutagenic agents and their applications to gene transfer. Gene mapping. Hybridomas and use of monoclonal antibodies. Recombinant DNA technology, application in food industries, agriculture and diseases e.t.c.	
BCH 414	**BIOENERGETICS** Membrane potential and nerve impulses. High-Energy compounds; redox reactions; energy conversion in living organisms; photosynthesis, oxidative phosphorylation. Mechanism of energy coupling. Chemical thermodynamics, membrane transport (diffusion, facilitated and active transport, energetics); Natural and artificial membrane bilayers- the unit membrane hypothesis	**2**
BCH 415	**BIOCHEMICAL REASONING** Evaluation and design of experimental biochemistry from available information and data. Analysis, interpretation and inference- drawing from biochemical research data.	**1**
BCH 416	**IMMUNOCHEMISTRY** Basic immunology. Antigens, antibodies and their reactions. Classification and structural motifs of immunoglobulins. Antibody combining sites and structure –function relationship, complement system and fixation. Organization of immunoglobulin genes. Molecular basis of antibody diversity. Production, detection and uses of monoclonal antibodies. Concepts of clinical immunology. Immune tolerance, factors affecting immune response.	**2**
BCH 417	**ADVANCED BIOCHEMICAL METHODS** The purpose of this course is to familiarize students with operations of latest biochemical equipment's and with methods of assimilation and dissemination of information. Students will therefore go round Lecturers and Laboratories housing specialized equipment's with the aim of exposing them to such equipment under the supervision of the lecturer. Part of the course will also cover the effective use of the library, preparation of dissertations or theses, papers for journal, publication and conferences. Special assignments essays will be given to students. Processing and analysis of data (processing operations, Measurement of central tendency and variability, and correlation.)	**2**
BCH 418	**MEMBRANE BIOCHEMISTRY** Structure, composition and function of biological membrane, isolation, characterization and classification of membrane, chemistry and biosynthesis of membranes. Molecular organisation of membrane components. Role of	**2**

	membrane in cellular processes (signal transduction, solute transport, signalling, etc). plasma membrane- chemical composition, fluidity, dynamic nature (cell fusion and protein diffusion); Structure and function of endomembrane system (endoplasmic reticulum, Golgi complex, lysosomes; Cellular uptake (phagocytosis and endocytosis). Transport of sugar and amino acids; ionophore. Glycoprotein, bacterial cell wall.	
BCH 419	**INDUSTRIAL AND PROCESS BIOCHEMISTRY** Metabolic pathways, control and application; continuous culture methods, principle and applications; the chemostat and its applications in industrial fermentation. Fermentation, Process evaluation and development; over-production of metabolites, methods for screening and selecting microorganisms of industrial importance. Microbial production of beer, wine, bread and cheese. Methanogenesis: mechanism and application for waste treatment production methods in industrial microbiology, agricultural microbiology, strain improvement strategies for industrial organisms.	**3**
BCH 420	**ENDOCRINOLOGY** Hormones: Biochemistry and molecular mechanism of action, cyclic AMP. Hormone receptors: isolation and properties. Diabetes mellitus and hypoglycemia. Biochemistry and functions of insulin and other hormones controlling carbohydrate metabolism. The thyroid hormones: biochemistry and functions. The steroid hormones; mineralocorticoids and glucocorticoids.	**2**
BCH 421	**ADVANCED BIOTECHNOLOGY** Microbial physiology and genetics. Coordination of microbial metabolism, biosynthesis of metabolites. Microbiological production of pharmaceutics (hormones and interferon) and industrial chemicals. Production of antibiotics, cellulose, and starch hydrolysis. Principles of industrial scale production of enzymes (techniques in fermentations). Large- scale extraction and purification. Principles and design of immobilized-enzyme reactors. Characteristics of free versus immobilized enzymes. Immobilized coenzymes and cells. Enzyme utilization in industrial processes.	**3**
BCH 422	**PHARMACOLOGICAL BIOCHEMISTRY** Cellular metabolism in infected cells. Biochemical aspects of host-parasite relationships. Metabolic factors affecting chemotherapeutic agents. Theory of the mechanism of drug action. Drug resistance and other factors affecting drug efficacy. The physiological and biochemical action of some selected drugs. Nigeria traditional medicinal plants in the management and therapy of	**2**

	common ailments in Nigeria: malaria, sickle-cell anaemia, common cold, hepatitis etc.	
BCH 423	**TISSUE BIOCHEMISTRY** Liver, Distribution of nutrients; urea synthesis, excretory functions, detoxification reaction. Kidney renal functions and the composition of urine. Blood, cellular components and plasma proteins. Muscle structure, mechanism of contraction. Nerves; synapses, neurotransmitter; hormones; physiological actions and biochemical mechanisms.	**2**
BCH 424	**CLINICAL AND FORENSIC BIOCHEMISTRY** Genetic basis of diseases, Aberration/Mutation, causes and consequence, Molecular diseases affecting the Haemoglobins (Haemoglobinopathies). Thalassemia and sickle cell anaemia. Inborn errors of metabolism of proteins, carbohydrate, nucleic acids and lipids. Diabetes mellitus and Diabetes insipidus. Diseases associated with carbohydrate, protein, nucleic acid and lipid metabolism. Biochemical investigation and biochemistry of AIDS Virus. Enzyme in diagnosis. Cancer and cancer therapy. Forensic science: Procedure for the extraction of contaminants of forensic interest from tissues. Collection and preservation techniques for materials of forensic interest. Analytical procedures in forensic science. Law, science and medicine in forensic practices.	**3**
BCH 425	**BIOINORGANIC CHEMISTRY** Relationship between the physicochemical properties and biological functions of inorganic ions(ionic gradients, 1mineralization and blood clotting), trace elements in biological systems. Ligand complexes and their biochemical significance. Electrolyte metabolism (iron, calcium, selenium, etc). Nitrogen fixation and sulphur cycle; incorporation of nitrogen and sulphur.	**2**
BCH 426	**SEMINAR IN BIOCHEMISTRY** Literature search, presentation of seminars on comprehensive literature review of selected research topics in Biochemistry and other related fields	**2**
BCH 427	**RESEARCH PROJECT** This entails supervised research work in selected areas/topics of interest in Biochemistry by final year student. The project will be presented in chapters 1 to 6 which will contain: introduction, literature review, research methodology, results, discussion, conclusion and recommendation respectively (also, a list of all referenced work should be stated). The final	**6**

	aspects of the course will be the project defence, which will be examined and graded by an external examiner.	

BIOCHEMISTRY PROGRAMME

ACADEMIC STAFF LIST

1.	Dr. E. M. Omwirhiren	Biochemistry	B.Sc, M.Sc, Ph.D (Biochemistry)	Associate Professor	Adjunct
2.	Dr. K. C. Komolafe	Biochemistry	B.Sc, M.Sc, Ph.D (Biochemistry)	Associate Professor	Adjunct
3.	Dr. E. O. Oyekanmi	Plant Pathology/Environmental Microbiology	B.Sc, M.Sc (Microbiology), Ph.D (Plant Pathology)	Associate Professor	Full-Time
4.	Dr. O. Faokunola	Biochemistry	B.Sc, M.Sc, Ph.D (Biochemistry)	Senior Lecturer	Adjunct
5.	Dr. A. O. Agboola	Biochemistry	B.Sc, M.Sc. PhD (Biochemistry)	Senior Lecturer	Full-Time
6.	Dr. O. V. Omotoyinbo	Biochemistry	B.Tech, M.Tech (Biochemistry)	Senior Lecturer	Adjunct
7.	Dr. F. D. Owoeye	Biochemistry	B.Sc, M.Sc. PhD (Biochemistry)	Senior Lecturer	Full-Time
8.	Dr. P. A. Dabesor	Biochemistry	B.Sc, M.Sc. PhD (Biochemistry)	Lecturer II	Full-Time
8	Dr. A. A. Ogunwole	Plant Physiology	B.Sc, M.Sc PhD (Botany)	Lecturer I	Full-Time
10.	Mr. C. H. Onwuegbuchulam	Biochemistry	B.Sc, M.Sc (Biochemistry)	Assistant Lecturer	Full-Time
11.	Mr. I.M. Olorunyolemi	Biochemistry	B.Sc(Biochemistry)	Graduate Assistant	Full-Time

TECHNICAL STAFF LIST

S/N	NAME	QUALIFICATION	DESIGNATION	APPOINTMENT
1.	Mr. I. A. Adelakun	HND- Registered Technologist	Senior Technologist	Adjunct
2.	Mr. Saviour Idiongsit	HND	Technology II	Full-Time

5	Mrs. A. Raji	B.Sc, M.Sc	Curator I	Full-Time
6.	Mrs. F. Olatunji	B.Sc	Curator II	Full-Time
7.	Mr. O. F. Ogundipe	B.Sc	Lab. Scientist	Full-Time

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	DESIGNATION	APPOINTMENT
1.	Mrs. Funbi Richards	HND	Personal Secretary I	Full-Time

COMPUTER SCIENCE PROGRAMME

3.0 INTRODUCTION AND GENERAL BACKGROUND

The Department of Computer Science evolved to become a unique academic unit in the production of highly trained graduates in Computer Science and Information Technology since the year 2008. The Department is growing with well resourceful and dedicated academic and non academic staff, who are committed to high standard of teaching, mentoring and research. The Department offers a Bachelor of Science (B.Sc) degree programme in Computer Science. It is worthy to note that the department has turned out graduates who have excelled in different spheres of life: both in private/public parastatals in and outside the country.

4.0 PHILOSOPHY

The programme is designed to give students the opportunity to obtain a broad knowledge of Computer Science, expose students to the relevant bedrock of scientific knowledge in Computing and Information Technology. Our programme is tailored to meet the interest and needs of students in all fields of Computer Science both in academics and industries.

5.0 OBJECTIVES

The specific objectives of the programme are, among others to:

i. have a thorough programme that will sufficiently expose both theoretical and practical aspects of Computer Science
ii. equip students that will be able to work effectively in the public and industrial sectors of the economy.
iii. equip students that will be able to undertake higher degrees and take up jobs in institutions of higher learning.
iv. offer opportunities for sound development of Computer Science to meet the global competitiveness in Computing as well as Information and Communication Technology Sectors.

6.0 PROGRAMME OFFERED AND DURATION

The programme offered is Bachelor of Science Degree in Computer Science. On duration of the programme, candidates who enter through the Unified Tertiary Matriculation Examination (UTME) normally, will spend 4 years (Minimum), while the Direct Entry or Inter-University transfer candidates will spend 3 years (Minimum).

7.0 ADMISSION REQUIREMENTS

Minimum Entry Requirements into B.Sc Degree in Computer Science

7.1UTME Entry Requirements (INTO 100 LEVEL)

(a) Five O'Level credit passes at the SSCE (GCE, NECO, and NABTEB) at not more than two sittings, must include English Language, Mathematics, Physics, and at least two from Chemistry, Biology, Physical Education, Statistics, Agricultural Science, Additional Mathematics, Economics, Geography, Commerce, and Computer Craft/Studies.

(b) UTME subjects must include Mathematics, Physics, and one of Biology, Chemistry, Agric Science, Economics and Geography.

7.2 Direct Entry/Transfer Requirements (INTO 200 LEVEL)

Students coming into 200 level of the Computer Science degree programme must satisfy one of the following:

(a) Passes in two A' level subjects which must include Mathematics, **provided 7.1(a) is satisfied.**

(b) At least Lower Credit (ND) in Computer Science, Computer Engineering, Information and Communications Technology (ICT), Mathematics, Statistics, Electronics/Electrical Engineering, Physics, or Electronics **provided 7.1(a) is satisfied.**

(c) NCE with at least Merit Pass in Computer Science, Computer Engineering, ICT, Mathematics, Physics, Electronics or Statistics can also be considered, **provided 7.1(a) is satisfied.**

(d) Transfer students into the Department must be of good academic standing through their academic transcript and must have completed 100level of Computer Science or a related Programme in WesleyUni or a recognised University with a CGPA of not less than 2.40 on a scale of 5.

(e) Student with Interim Joint Matriculation Board (IJMB), Joint Universities Preliminary Examination Board (JUPEB) must be of good academic standing with not less than a C grade.

7.3 **Direct Entry / Transfer Requirements (HND)**

Students coming into 300 level of the Computer Science degree programme must satisfy one of the following:

(a) At least Lower Credit (HND) in Computer Science, Computer Engineering, ICT, Mathematics, Statistics, Electronics/Electrical Engineering, Physics, or Electronics **provided 7.1(a) is satisfied.**

(b) Transfer students into the Department must be of good academic standing through their academic transcript and must have completed 200level of Computer Science or a related Programme in WesleyUni or a recognised University with a CGPA of not less than 2.40 on a scale of 5.

(c) Graduates (B.Sc holders) with Third class or Pass degree.

8.0 REQUIREMENTS FOR AWARD OF DEGREE: For a student to qualify for the award of the degree, he/she must have satisfactorily offered and passed the following categories of courses:

Compulsory Courses: These are courses which students must offer and pass before graduation.

Elective Courses: These are departmental-prescribed courses which are required to be registered and passed to meet the minimum requirements of the University before graduation.

Pre-requisiteCourses: Theses are courses which must be offered and passed before a particular course could be offered.

Other requirements are:

(i) Candidates must register for the appropriate compulsory and elective courses as indicated in the programme.

(ii) Courses, which may be designed as prerequisites to some other courses, must be taken and a score of at least 40% is required to be able to offer the subsequent courses.

(iii) The minimum workload is 15 units and the maximum is 24 units for each semester.

A student can withdraw from the time stipulated by Senate without penalty only with the approval of the HOD on completion

(iv) of add/delete form. Any student who withdraws without permission will be deemed to have failed the course.

(v) Any course examination sat for without registration will be cancelled.

To be eligible for the award of B.ScHonours degree in Computer Science, a student admitted through UTME must offer and pass a minimum of 169 units of Courses while a student admitted through direct entry must offer and pass a minimum of 121 units of Courses.

4-YEAR PROGRAMME

Level	**Compulsory/Core**		**Required**		**GNS/LIB/ENT**		**Electives**		**Total**	
	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester
200	9	9	6	7	4	2	2	2	21	20
300	9	15	15	-	-	-	-	-	24	15
400	7	11	12	6	-	-	2	3	21	20
Total	**25**	**35**	**33**	**13**	**4**	**2**	**4**	**5**	**66**	**55**
TOTAL									**121**	

Note: Students on 3-Year programme must offer in addition to the specified courses above, **12 units** of **GST** and**ENT** courses offered by students on 4-Year programme in their first year (100 Level). The students are to register for the courses on the advice of the department.

SUMMARY

S/N	Category	4-Year Programme	3-Year Programme
1	Compulsory Courses	100	60

Level	Compulsory/Core		Required		GNS/LIB/ENT		Electives		Total	
	1st Sem	2nd Sem	1st Sem	2nd Sem	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester
100	20	20	-	-	4	4	-	-	24	24
200	9	9	6	7	4	2	2	2	21	20
300	9	15	15	-	-	-	-	-	24	15
400	7	11	12	6	-	-	2	3	21	20
Total	**45**	**55**	**33**	**13**	**8**	**6**	**4**	**5**	**90**	**79**
						169				

	Required	46	46
2	Elective Courses	9	9
3	GNS/ENT/LIB Courses	14	6
	MINIMUM TOTAL	**169**	**121**

9.0 REGISTRATION FOR COURSES:

A student must register for a minimum of 15 credit units and a maximum of 24 units of courses each semester.

3-Year Programme

10.0 EXAMINATION AND GRADING SYSTEM

i. Each course shall normally be examined at the end of the semester in which it is offered.
ii. The length of an examination shall be a period of not less than one hour and not more than three hours.
iii. Each course shall be graded on the basis of 100 total marks with continuous assessment by way of test, assignment and other approved means constituting 30% and course examination constituting 70%.
iv. The score for each courses shall be assigned grades and grade points as presented in the table below:

MARKS	LETTER	GRADE POINT
70-100	A	5
60-69	B	4
50-59	C	3
45-49	D	2
40-45	E	1

<40	F	0

Academic Standing

i. A student shall be deemed to be in good academic standing as long as his/her cumulative G.P.A. is not below 1.5
ii. A student shall be given warning if his/her C.G.P.A is below 1.0 for the first time. This shall be indicated by the marks 'WN'against the name of such student on the result sheet.
iii. A student shall be placed on 1st probation marked with `P1` if his C.G.P.A is below 1.5 for the second consecutive semester; if his C.G.P.A is below 1.5 for the 3rd consecutive semester he shall be placed on 2nd probation marked with`P2`
iv. A student with a C.G.P.A of less than 1.5 in his/her 4th consecutive semester shall be required to withdraw from the department. Such a student may be allowed to seek admission into a level not higher than 200 in any other Department/Faculty in the University.

A student required to withdraw shall seek and obtain admission into any faculty or department within 4 weeks of the notice of withdrawal after which the withdrawal notice shall stand.

B. Graduation Requirement

To be eligible for the award of a Bachelor's degree of the Wesley University Ondo, a student must pass the following minimum total number of units:

3-Year Programme	4- Years Programme
121	169

The cumulative grade point average shall be obtained by

i. Multiplying the grade point assigned to the letter grade obtained in each course by the number of units assigned to the course to get the weighted score for each course;
ii. Adding together the weighted scores for all courses taken up to that time; and
iii. Dividing the total weighted score by the total number of units

Classification of Degree

For the purpose of computation of results for graduation, all courses taken by a student shall count.

Degree classification shall be based on the cumulative grade point average(CGPA) obtained by each student as follows:

CGPA	CLASS OF DEGREE
4.50-5.00	1st Class (Hons.)
3.50-4.49	2nd Class (Hons.)(Upper Division)
2.40-3.49	2nd Class(Hons.)(Lower Division)
1.50-2.39	3rd Class (Hons.)
Less or equal to 1.49	Fail

11.0 COURSE OFFERING

100 LEVEL FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNIT	STATUS
CSC 111	Introduction to Computing Concepts	3	C
MTH 111	General Mathematics I	3	C
CHM 111	General Chemistry I	3	C
CHM 113	Experimental Chemistry Lab I	1	C
MTH 113	General Mathematics II	3	C
PHY 111	General Physics I	3	C
PHY 117	General Physics Lab I	1	C
LIB 111	Use of Library, Study Skills/Information Retrieval	2	C
GNS 111	Use of English (Communication Skills I)	2	C
BIO 111	General Biology I	3	C
	Total	**24**	

100 LEVEL SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNITS	STATUS
CSC 122	Intro. To Problem Solving (VB Programming)	3	C
MTH122	Elementary Mathematics II	3	C
MTH 124	Introductory Applied Mathematics	2	C
MTH 123	Statistics for Physical Sciences	4	C

PHY 122	General Physics II	3	C
PHY 128	General Physics Lab II	1	C
CHM 122	General Chemistry II	3	C
CHM 124	General Chemistry Lab II	1	C
GNS 121	Use of English II	2	C
GNS 122	Intro to Philosophy and Logic	2	E
	TOTAL	**24**	

200 LEVEL FIRST SEMESTER COURSES

COURSE CODE	**COURSE TITLE**	**UNIT**	**STATUS**
CSC 211	Structured Programming (with C/C++)	3	C
CSC 212	Computer Programming II (with Python)	3	C
CSC 215	Operating Systems I	3	C
CSC 217	Discrete Structures	3	R
MAT 211	Mathematical Methods I	3	R
ENT 211	Introduction to Entrepreneurship	2	C
GNS 212	Nigerian People and Cultures	2	C
	Elective	2	E
	TOTAL	**21**	

Elective Courses

Students are free to choose minimum of 1 course from the following

COURSE CODE	COURSE TITLE	UNIT	STATUS
MAT 213	Linear Algebra I	2	E
CSC 214	Digital Computer Logic	2	E

200 LEVEL SECOND SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNIT	STATUS
CSC 221	File Organisation and Data Processing	2	C
CSC 222	Computer Hardware	3	R
CSC 223	Machine and Assembly Language	2	C
CSC 224	Fundamentals of Data Structures and Algorithms	3	R
CSC 226	Analysis and Design of Digital Systems (with Computer Logic)	3	C
CSC 228	Foundations of Sequential Programming	3	R
ENT 221	Introduction to Entrepreneurship	2	C
	Elective	2	E
		20	

Elective Courses

Students are free to choose minimum of 1 course from the following

COURSE CODE	COURSE TITLE	UNIT	STATUS
EEE 222	Electric Circuits and Electronics	2	E

MAT 224	Linear Algebra II	2	E
PHY 324	Solid State Physics I	3	E

300 LEVEL FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNIT	STATUS
CSC 311	Operating Systems II	3	C
CSC 312	Data Mgt/Database Systems I	3	C
CSC 313	Object-Oriented Programming (with Java)	3	R
CSC 314	Systems Analysis and Design	3	R
CSC 315	Design of Algorithms & Complexity Analysis	3	R
CSC 317	Compiler Construction I	3	R
CSC 319	Survey of Programming Languages	3	C
		21	

300 LEVEL SECOND SEMESTER COURSES (SIWES SEMESTER)

NEW CODE	COURSE TITLE	UNIT	STATUS
CSC 320	SIWES Report Writing	3	C
CSC 322	Industrial Based SIWES Assessment	2	C
CSC 324	SIWES Site Visit Assessment	3	C
CSC 326	SIWES Logbook Assessment	3	C
CSC 329	SIWES Seminar Presentation/Examination	4	C

	Total	**15**	

400 LEVEL FIRST SEMESTER COURSES

COURSE CODE	COURSE TITLE	UNIT	STATUS
CSC 410	Computer Architecture and Organization	3	R
CSC 411	Data Mgt/Database Systems II	3	C
CSC 412	Net-Centric Computing	3	R
CSC 413	Artificial Intelligence& Expert Systems	3	R
CSC 415	Computer Systems Performance Evaluation	3	R
CSC 419	Software Engineering	4	C
	Elective	2	E
	Total	**21**	

Electives

Students are free to choose minimum of 1 course from the following

COURSE CODE	COURSE TITLE	UNIT	STATUS
CSC 414	Computer Graphics and Visualization	2	E
CSC 417	Introduction Computer Security	3	E
CSC 418	Project Management	3	E

400 LEVEL SECOND SEMESTER COURSE

COURSE CODE	COURSE TITLE	UNIT	STATUS

CSC 422	Modelling and Simulation	3	R
CSC 424	Human Computer Interaction	2	C
CSC 425	Formal Models of Computation	3	R
CSC 427	Computer Networks/Communications	3	C
CSC 429	Research Project	6	C
	Elective (Minimum of 3 units)	3	E
	Total	**20**	

Electives

Students are free to choose minimum of 1 course from the following

COURSE CODE	**COURSE TITLE**	**UNIT**	**STATUS**
CSC 421	Intro. to Internet Technology & Web Programming	3	E
CSC 423	Distributed Computing System	3	E
CSC 426	Current Topics in Computing	3	E
CSC 428	Compiler Construction II	3	E

1.0 COURSE DESCRIPTIONS

Note “C” stands for Compulsory, “R” stands for Required while “E” stands for Elective status.

CSC 111 INTRODUCTION TO COMPUTER SCIENCE (3 UNITS: LH 30, PH 45) C

This Course will basically cover the survey of computers, information processing and their roles in society. It should introduce the historical perspective of computing, hardware,

software, information systems and human resources but should also explore their integration and application in business and other areas of the society. Students will be required to complete lab assignments using Personal Computers loaded with Windows Operating System and several commonly used applications, such as Word Processors, electronic Spreadsheets, Presentations, graphics and other applications. Internet and online resources, browsers and search engines should be taught.

CSC 122 INTRODUCTION TO PROBLEM SOLVING - VB PROGRAMMING I (3 UNITS:LH 30, PH 45) C

Problem solving strategiesusing Algorithms and Flowchart designs and Pseudocodes. Role of algorithm in problem solving process, implementations strategies, concepts and properties of algorithm. Fundamentals and Forms of BASIC Programming. Constants, Variables Operations in Q-Basic and Visual Basic. Data types and expressions, assignment statements, arrays, subscripts, expressions and control statements. Decision steps; Conditional – if statements, repetition and loops. Function and Subroutine sub-programs. Programming with Files and String Manipulation. Visual Basic Fundamentals and Use of Visual Tools.

CSC 211 SRUCTURED PROGRAMMING (WITH C/C++) (3 UNITS: LH 45) C

Concepts, Elements and principles of Structured Programming, Structured design principles, abstraction and modularity, structured design techniques. Structured programming concepts; control flow, invariant relation of a loop; stepwise refinement of both statement and data; program modulation (Bottom up approach, top-down approach, nested virtual machine approach);

CSC 212 COMPUTER PROGRAMMING II (FORTRAN) (3 UNITS: LH 30, PH 45) C

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used

programming language should be used in teaching the above. E.g. FORTRAN Declaration, Data types, Precisions, Operations, built-in functions. Conditional – if statements, repetition and loops . arrays, Function and Subroutine sub-programs. Format and Files. String manipulations.

pre-requisite CSC122

CSC 214 DIGITAL COMPUTER LOGIC (2 UNITS: LH 45) E

Number representation, binary, hexadecimal, and decimal base conversion. Negative numbers, One's complement arithmetic, Two's complement arithmetic, fixed and floating-point arithmetic.Introduction to the internal structure of digital computers. Central Processing Units (CPU), Memory Devices, Input and Output channels. Storage primitives. Design of gates, Boolean Algebra. The standard sum of product and the standard product of sums, minimum term and maximum term specification of logic functions, truth table of Karnaugh maps, circuit minimization using k-map representation of two, three and four variables. Overlapping groups, rolling the map, eliminating redundant four, don't care conditions, k-map for five and six variables. Quine-McCluskey Algorithm Pre-requisite: CSC 122

CSC 215 OPERATING SYSTEMS I (3 UNITS: LH 30, PH 45) C

An overview of Operating Systems; Roles and Purpose, Structures and functions of operating systems, multiprogramming, multitasking/multi-user, timesharing process state models and scheduling algorithms, memory management, interrupt processing, resource protection and deadlock. Functionality mechanisms to support client-server models, handheld devices; design issues of security, networking, multimedia, etc. Structuring methods, Abstraction and process of APIs device organization.

CSC 217 DISCRETE STRUCTURES (3 UNITS: LH 45) R

Basic Set Theory: Basic definitions, Relations, Equivalence Relations Partition, Ordered Sets. Boolean Algebra & Lattices, Logic, Graph theory: Directed and Undirected graphs, Graph

Isomorphism, Basic Graph Theorems, Matrices; Integer and Real matrices, Boolean Matrices, Matrices med m, Path matrices. Adjacency Vectors/Matrices: Path adjacency matrix, Numerical & Boolean Adjacency matrices. Applications to counting, Discrete Probability and Generating Functions.

CSC 211 FILE ORGANISATION & DATA PROCESSING(2 UNITS: LH 30, PH 45) E

Basic physical characteristics of I/O and auxiliary storage device, types of memory access, concept of data, physical and logical records, inter-record gaps, record structuring, fields, files type of files, hierarchical files, files on certain I/O devices, operation on files, label, buggering, blocking and deblocking, director structures, opening and closing files, files access control and access methods, creating and deleting files, backup procedures, searching and sorting technique, merging, high level programming language such as C++, BASIC e.t.c.

CSC 222 COMPUTER HARDWARE (3 UNITS: LH 30, PH 45) R

Computer circuits, diode arrays, PIAs, etc. Integrated circuits fabrication process. Use of MSI, LSI, and VLSI, hardware designs. Primary and secondary memories; core memory, etc. Magnetic devices; disks, tapes, video disks, etc. peripheral devices; printers, CRTs, keyboards, character recognition. Operational amplifiers; Analog-to-digital and digital-to-analog converters.

CSC 223 MACHINE AND ASSEMBLY LANGUAGE (2 UNITS: LH 30, PH 45) E

Introduction to machine level programming. Distinction between high level language and assembly language. Organization and use of memory, central processor, input/output devices. Program writing in Microsoft Assembly Language on microcomputers. Structures and modularity of programs and data at the machine level. Macro definition and overview of one other Assembly

language. Introduction to systems software. Instruction formats. Pseudo-code, instruction sets, and programmer's models of 8086/M68000 microprocessors. Assemblers, Data and address paths, Structure of instructions, Addressing modes, Conditional operations, Stack and subroutines.**Pre-requisite**: CSC 111

CSC 224 FUNDAMENTALS OF DATA STRUCTURES (3 UNITS: LH 30, PH 45) R

Primitive types, Arrays, Records Strings and String processing, Data representation in memory, Stack and Heap allocation, Queues, TREES. Implementation Strategies for stack, queues, trees. Run time Storage management; Pointers and References, linked structures Structured programming in C++ language: variables, Data types and arithmetic expressions. Program looping. Making Decisions, Arrays, Functions and Structures, Character Strings pointers. Operations on Bits. The preprocessor. Input and Output. Basicstructures for data representation. Dynamic storage allocation (Sorting, Searching). Algorithms analysis. Graphics and Network flows. Sequential and linked storage allocation (for linear, array, multi linked structures and string process techniques). Tree implementation, Tree traversal and the mathematical properties. Prerequisite : CSC 122

CSC 226 ANALYSIS AND DESIGNS OF DIGITAL SYSTEMS (3 UNITS: LH 30, PH 45) R

Design and Analysis of Digital Systems, Logic Gates, Switching Algebra, Flip Flops, Synchronous sequential circuits, Asynchronous sequential circuits, State Machines, Registers and Counters, Semiconductors Memories, Analogue Switches and Timing Circuit.

CSC 228 FOUNDATIONS OF SEQUENTIAL PROGRAMMING (3 UNITS: LH 45) R

The relationships between H/L languages and the Computer Architecture that underlies their implementation: basic machine architecture, assembles specification and translation of P/L Block Structured Languages, parameter passing mechanisms Declaration, Data types, Precisions, Operations, built-in functions. Conditional – if statements, repetition and loops . arrays, Function and Subroutine sub-programs. Format and Files. String manipulations pre-requisite CSC102

CSC 311OPERATING SYSTEMS II (3 UNITS: LH 45) C

Concurrency: States & State diagrams Structures, Dispatching and Context Switching; interrupts; Concurrent execution; Mutual exclusion problem and some solutions Deadlock; Models and mechanisms (Semaphones, monitors etc.) Producer – Consumer Problems & Synchronization. Multiprocessor issues. Scheduling &Despatching Memory Management: Overlays, Swapping and Partitions, Paging & Segmentations Placement & replacement policies, working sets and Trashing, Caching. Sequential processes, Concurrent processes and Real-time processes, Processor management, Design strategies and study of several operating systems

CSC 312 DATA MGT/DATABASE SYSTEMS I (3 UNITS: LH 45) C

Information storage & retrieval, Information management applications, Information capture and representation, analysis & indexing, search, retrieval, information privacy; integrity, security; scalability, efficiency and effectiveness. Introduction to database systems: Components of database systems DBMS functions, Database architecture and data independence use of database query language. Introduction to the concepts, approaches, tools and methodology of database design. The entity-relationship model, the model relational algebra, relational calculus and commercial languages such as SQL, functional dependencies, normal forms, design theory and optimization.

CSC 313 OBJECT-ORIENTED PROGRAMMING WITH JAVA (3 UNITS: LH 45) C

Basic OOP Concepts: Classes, Objects, inheritance, polymorphism, Data Abstraction, Tools for developing, Compiling, interpreting and debugging, Java Programs, Java Syntax and data objects, operators. Central flow constructs, objects and classes programming, Arrays, methods. Exceptions, Applets and the Abstract, OLE, Persistence, Window Toolkit, Laboratory exercises in an OOP Language (Java).

CSC 314 SYSTEM ANALYSIS AND DESIGN (3 UNITS: LH 30, PH 45) R

System Concept; System Development Life Cycle

Analysis: Fact gathering Techniques, data flow diagrams, Process description data modelling.

System Design: Structure Charts, form designs, security, automated Tools for design. UML modelling

CSC 315 DESIGN OF ALGORITHMS AND COMPLEXITY ANALYSIS (3 UNITS: LH 45) R

Basic Algorithm analysis: Asymptotic analysis of Upper and average complexity bounds; standard complexity classes time and space tradeoffs in algorithms analysis recursive algorithms.

Algorithmic strategies: Fundamental computing algorithms; numerical algorithms, sequential and binary search algorithms; sorting algorithms, binary search tress, hash tables, graphs and their representations.

CSC 317 COMPILER CONSTRUCTION I(3 UNITS: LH 45) C

Review of compilers assemblers and interpreters, structure and functional aspects of a typical compiler, syntax semantics and pragmatics, functional relationship between lexical analysis, expression analysis and code generation. Internal form of course programme. Use of a standard compiler (FORTRAN<COBOL/PL) as a working vehicles. Error detection and recovery. Grammars and Languages: the parsing problem. The scanner.

CSC 319 SURVEY OF PROGRAMMING LANGUAGES (4 UNITS: LH 45, PH 45) C

Overview of programming languages: History of programming languages, Brief survey of programming paradigms (Procedural languages, Object-oriented languages, Functional languages, Declarative – non-algorithmic languages, Scripting languages), the effects of scale on programming methodology; Language Description: Syntactic Structure (Expression

notations, abstract Syntax Tree, Lexical Syntax, Grammars for Expressions, Variants of Grammars), Language Semantics (Informal semantics, Overview of formal semantics, Denotation semantics, Axiomatic semantics, Operational semantics); Declarations and types: The concept of types, Declaration models (binding, visibility, scope, and lifetime), Overview of type-checking, Garbage collection; Abstraction mechanisms: Procedures, function, and iterations as abstraction mechanisms, Parameterization mechanisms (reference vs. value), Activation records and storage management, Type parameters and parameterized types, Modules in programming languages; Object oriented language paradigm; Functional and logic language paradigms.

CSC 320, 322, 324, 326, 329 STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES) (15 UNITS) C

Each student is attached to a computer installation/industry. A report of the student's project is submitted for grading in the department. Supervision will be jointly done by an academic staff of the department and a supervisor from the SIWES unit

CSC 410 COMPUTER ARCHITECTURE AND ORGANIZATION II (3UNITS: LH 45) R

Fundamental building blocks, logic expressive immunization, sum of product forms. Register transfer notation, Physical considerations. Data representation, and number bases, Fixed and Floating point systems, representation memory systems organization and architecture.

Memory system; general characteristics of memory operation, (technology of magnetic recording, semi-conductor memory, charged couple devices, magnetic bubble); Memory addressing, memory hierarchy, virtual memory control systems, hardwired control, microprogrammed control, asynchronous control, I/O control. Introduction to the methodology of fault tolerant computing. Flynn's taxonomy, system examples of SISD, SIMD, MISD, MIMD. Architectures; Havard, pipeline, vector, systolic, parallel, computers. Parallel computing languages: OCCAM, ADA.

CSC 411 DATA MGT/DATABASE SYSTEMS II (3 UNITS: LH 30, PH 45) C

Rational Databases: Mapping conceptual schema to relational Schema; Database Query Languages (SQL) Concept of Functional dependencies & Multi-Valued dependencies.

Transaction processing; Distributed databases. Text: CJ Date. Other topics may include concurrency control, distributed systems security, knowledge base and concept of object-oriented database systems, client/server systems, data warehouse, web database development and database administration

CSC 412 NET-CENTRIC COMPUTING (3UNITS: LH 45) R

Introduction to Net-centric Computing, Distributed Computing, Mobile & Wireless computing, Network Security; Client/Server Computing (using the web), Building Web Applications.

CSC 413 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS (3 UNITS: LH 45) C

Introduction to artificial intelligence, understanding natural languages, knowledge representation, expert systems, pattern recognition, the language LISP. Search methods, search space, natural languages, knowledge representation; expert systems; definition and basic concepts, principles of expert systems. Architecture of expert systems. Knowledge engineering; acquisition, representations, uncertainty handling; fuzzy systems, inference engine; backward and forward chaining; control strategies. Expert system, shells/tools, languages. Evaluations and applications, PROLOG/LISP programming. Pattern recognition.

CSC 414 COMPUTER GRAPHICS & VISUALIZATION (2 UNITS: LH 30, PH 45) E

Hardware aspects; plotters microfilm, plotters displays, graphics tablets, light pens, other graphical input aids. Facsimile and its problems. Refresh huggers, changing images, light pen interaction. Two and three-dimensional transformations, perspective. Clipping algorithms, hidden live removal, bolden surface removal; Warnock's method, shading data reduction for graphical input, introduction to hard writing and character recognition. Curve synthesis and fitting. Contouring, Ring structures versus doubly linked list. Hierarchical structures; data structure; organization for interactive graphics. Introduction to fractals and chaos. Virtual environment technology, requirements and applications; presence; displays; programming virtual environments; devices.

CSC 415 COMPUTER SYSTEM PERFORMANCE EVALUATION (3 UNITS: LH 45) E

Measurement techniques; simulation techniques; analytical techniques; workload characterization; performance evaluation in selection problems; performance evaluation in design problems; evaluation of programme performance.

CSC 417INTRODUCTION TO COMPUTER SECURITY (3UNITS: LH 45) C

Introduction and fundamentals of Network Security,Typical Network Security Network security models, Vulnerability to threat and attack, Basic types of attacks,Importance of Effective Network Security Strategies, Managing network security.

CSC 418: PROJECT MANAGEMENT (3 UNITS: LH 30, PH 45) E

Team Management, Project Scheduling, Software measurement and estimation techniques, Risk analysis, Software quality assurance, Software Configuration Management, Project Management tools.

CSC 419 SOFTWARE ENGINEERING (4 UNITS: LH 45, PH 45) C

Software Design: Software architecture, Design Patterns, O. O. analysis & Design, Design for re-use.

Using APIS: API programming Class browsers and Related tools, Component based computing.

Software tools and Environment: Requirements analysis and design modeling Tools, Testing tools, Tool integration mechanism.
Wider software engineering context; embedded software and system Engineering; software engineering process, software architecture; UML extension mechanisms; object constraint language and model check.

CSC 421INTERNET TECHNOLOGY AND WEB PROGRAMMING (3UNITS: LH 45) C

Introduction to Internet Technology and Web Design, Problem solving using JavaScript/HTML/PHP programming language; Treatment of the following topics under the language chosen; data type and declaration statements, constants, variables, expressions and

assignments, transfer of data (input and output), control structures. String manipulations, procedures and functions e.t.c Emphasis is on programming exercises with implementation.

CSC 422 SYSTEM MODELING AND SIMULATION (3 UNITS: LH 30, PH 45) E

Basic Definitions and Uses, Simulation Process, Some basic statistic Distributions Theory, Model and Simulation. Queues; Basic components, Kendal notation, Queuing rules, Little's Law, Queuing networks, Special/types of queues. Stochastic Processes; Discrete state and continuous state processes, Markov processes, Birth-Death Processes, Poisson Processes. Random Numbers; types of Random Number Exercises.

CSC 423 DISTRIBUTED COMPUTING SYSTEMS

Introduction: definitions, motivation, communication mechanisms; communication protocols, RPC, RMI, Stream oriented communication; **Synchronization**: global state, election, distributed mutual exclusion, distributed transactions; **Naming**: generic schemes, DNS, naming and localization; **Replication and coherence:** consistency models and protocols;

Fault tolerance: group communication, two-and-three phase commit, check pointing; **Security**: access control, key management, cryptography, distributed file systems: NFS, coda, etc.

CSC 424 HUMAN COMPUTER INTERACTION (2 UNITS: LH 30) C

Foundations of HCI, Fundamental principles of HCI, Principles of GUI, GUI toolkits; Human-centred software evaluation and development; GUI design and programming**.**

CSC 425 FORMAL MODELS OF COMPUTATION (3 Units: LH 30, PH 45)

Automata theory: Roles of models in computation Finite state Automata, Push-down Automata, Formal Grammars, Parsing, Relative powers of formal models. Basic computability: Turing machines, Universal Turing Machines, Church's thesis, solvability and Decidability.

CSC 426SPECIAL TOPICS IN SOFTWARE ENGINEERING (3 UNITS: LH 30, PH 45) E

Special topics from improvement; software re-engineering configuration management; formal specification, software cost – cost estimation, software architecture, software patterns, software reuse and open source development.

Special topics from any area of computer science considered relevant at given time SUCH AS cloud computing, mobile/pervasive computing, big data analytic, etc.. Topics are expected to change from year to year. Apart from seminars to be given by lecturers and guests, students are expected to do substantial readings on their own.

CSC 427 COMPUTER NETWORKS/COMMUNICATION (3UNITS: LH 30, PH 45) C

Introduction, waves, Fourier analysis, measure of communication, channel characteristics, transmission media, noise and distortion, modulation and demodulation, multiplexing, TDM FDM and FCM Parallel and serial transmission (synchronous Vs asynchronous). Bus structures and loop systems, computer network Examples and design consideration, data switching principles broadcast techniques, network structure for packet switching, protocols, description of network e.g. ARPANET, etc. Basics of networking; network considerations, network components, network models (centralized computing, distributed computing, etc), network classification (geographical coverage, topologies, and mode of connection-like peer-to-peer etc.), network services (file services, message services, etc.) comparing LANs, MANs AND WANs. The OSI model. Network media; bounded media, unbounded media, data transmission. Network designs; ARKNET, Ethernet, Token, Ring, FDDI, Network protocol. Connecting networks; LAN connectivity devices (Repeaters, Bridges, etc), Internet working devices (Modems, Reuters, etc). Internet scaling problem (IP Address and Sub-netting)

CSC 428 COMPILER CONSTRUCTION II (3 UNITS: LH 45) E

Grammars and languages, recognizers, Top-down and bottom-up language Run-time storage Organization, The use of display in run-time storage Organization. The use of display in run time storage allocation. LR grammars and analysers. Construction of LR table. Organisation of symbol tablets. Allocation of storage to run-time variables. Code generation. Optimisation/Translator with systems.

CSC 429 RESEARCH PROJECT (6 UNITS: PH 270) C

A project to be chosen and approved by the Department and under the direction and supervision of a lecturer.

GEOLOGY AND MINING PROGRAMME

PHILOSOPHY AND OBJECTIVE OF GEOLOGY & MINING PROGRAMME

The undergraduate programme in Geology & Mining at the Wesley University is designed primarily to provide students with the basic requirements needed by a professional geologist in any of the fields in which geologists are required in a rapidly developing country like Nigeria. With this objective, the student is taught to some depth the more conventional and fundamental aspects of geology. In addition, he/she is given courses in the applied aspects of geology such as Hydrogeology, Applied Geophysics and Geochemistry, Engineering Geology and Petroleum Geology.

This will facilitate further specialization in any of the professional fields in which students may choose to work in later years, largely in mining and oil companies, water supply agencies, construction companies, international organizations(UNDP, UNICEF, UNESCO, IEA, etc.), public service (Federal and State Ministries of Solid Minerals Development, Petroleum, Water Resources, Agriculture, Works and Housing, Geological Survey, Steel Raw Materials Exploration Agency, National Metallurgical Development Centre, Coal Corporation), geological consultancy and teaching and research institutions.

STRUCTURE OF THE PROGRAMME

The B.Sc.programme lasts for 4years for UTME candidates who start at the 100 Level and 3years for Direct Entry candidates who join at the 200 Level. All students of the Department are expected to register for a minimum of 15 credit units and maximum of 24 credit units per semester. SIWES programme of six (6) credit units is slated for 2nd Semester of the 300 Level. Students are encouraged to carry out their final year projects in any of the diversified terrains of Nigerian geology covering sedimentary basins and/or igneous-metamorphic basement terrains but which must involve basic field geological mapping. Geology of Nigeria and field training are emphasized from an early stage of the course and geological mapping is carried out as an integral component of the course curricula at all levels from the 100 to 400 Level. At the end of the course, the students would have spent a minimum of about 14 weeks (100 days) in the field, mapping sedimentary and crystalline rocks on widely varying

scales. The fieldwork is meant to train the students towards continuous learning and practice as carrier professional mining geologists who can be registered by the Council of Mining Engineers and Geoscientists (COMEG).

ENTRY REQUIREMENTS

Candidates for admission into the BSc. degree programme in Geology and Mining must satisfy the University's minimum entry requirements, which stipulate 5 credits in the GCE-O Level, NECO or WAEC (in not more than 2 sitting)and these must include Biology, Chemistry, and Physics, in addition to credit passes in Mathematics and English Language.

In addition to the above requirements, candidates seeking admission into the 100 level must sit and pass the UniversityTertiary Matriculation Examination (UTME) administered by the Joint Admission and Matriculation Board (JAMB).

Candidates for the Direct Entry admission must have obtained minimum of Credit passes at the National Diploma in a subject related to Geology and Mining or must have obtained GCE-A level or IJMB passes of which two of the passes must include Physics, Chemistry, Geology, or Biology, in addition to O-level credit passes in Mathematics and English Language.

COURSES/CREDIT UNITS/PREREQUISITES

100 LEVEL

1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 111	INTRODUCTION TO GEOLOGY 1	3	
2	CHM 111	GENERAL PHYSICAL CHEMISTRY 1	2	
3	CHM 101	GENERAL PHYSICAL CHEMISTRY (PRACTICALS)	1	
4	MTH 111	ELEMENTARY MATHEMATICS 1	2	
5	PHY 111	GENERAL PHYSICS 1	2	
6	PHY 117	GENERAL PHYSICS (LABORATORY)	2	
7	CMP 111	INTRODUCTION TO COMPUTER SCIENCE	2	
8	BIO 111	GENERAL BIOLOGY 1	2	
9	GST 111	USE OF ENGLISH	2	
10	GST 111	NIGERIAN PEOPLE AND CULTURE	2	
		TOTAL CREDIT UNITS	**20**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 111	INTRODUCTION TO GEOLOGY II	3	GEM 111
2	CHM 121	GENERAL ORGANIC CHEMISTRY	2	
3	CHM 122	GENERAL INORGANIC CHEMISTRY	2	
4	CHM 102	ORGANIC CHEMISTRY (PRACTICALS)	1	
5	CHM 103	INORGANIC CHEMISTRY (PRACTICALS)	1	
6	MTH 121	ELEMENTARY MATHEMATICS II	2	
7	PHY 123	GENERAL PHYSICS II	2	
8	GST 122	PHILOSOPHY AND LOGIC	2	
9	GST 123	COMMUNICATION IN FRENCH OR ARABIC	2	
		TOTAL CREDIT UNITS	**17**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

200 LEVEL

1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 211	INTRODUCTION TO STRUCTURAL GEOLOGY AND MAP INTERPRETATION	3	GEM 111 & GEM121
2	GEM 213	CRYSTALLOGRAPHY AND MINERALOGY	3	GEM 111
3	GEM 214	INTRODUCTORY PETROLOGY	3	GEM 111 & GEM121
4	GEM 215	STRATIGRAPHY	2	GEM 121
5	GEM 216	INTRODUCTION TO MINING GEOLOGY	3	
6	CMP 211	COMPUTER PROGRAMMING	2	
7	CHM 211	ANALYTICAL CHEMISTRY	2	
8	GST 211	HISTORY AND PHILOSOPHY OF SCIENCE	2	
		TOTAL CREDIT UNITS	**20**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

ELECTIVES

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS
1	CHM 211	PHYSICAL CHEMISTRY II	3
2	MTH 212	ELEMENTARY DIFFERENTIAL EQUATIONS	3
3	CHM 212	ORGANIC CHEMISTRY	3
4	PHY 215	THERMAL PHYSICS	2

2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 221	INVERTEBRATE PALAEONTOLOGY	2	GEM 215
2	GEM 222	OPTICAL MINERALOGY	2	GEM 213
3	GEM 223	ENVIRONMENTAL GEOLOGY	2	
4	GEM 224	MINERAL RESOURCES/PROCESSING	3	
5	GEM 226	FIELD GEOLOGY I	2	GEM 211 & GEM214
6	CMP 221	COMPUTER PREGRAMMING II	2	
7	STA 223	STATISTICS FOR PHYSICAL SCIENCES	2	
8	GEO 223	ELEMENTARY SURVEYING	2	
9	ESP 221	ENTERPRENEURIAL PROCESSES AND SKILL DEVELOPMENT	2	
10	GST 222	PEACE STUDIES AND CONFLICT RESOLUTION	1	
		TOTAL CREDIT UNITS	**20**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

ELECTIVES

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS
1	CHM 223	PETROLEUM CHEMISTRY	2
2	CHM 225	ENVIRONMENTAL CHEMISTRY	2
3	MTH 221	INTRO. TO NUMERICAL ANALYSIS	3

300 LEVEL

1ST SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 311	STRUCTURAL GEOLOGY	2	GEM 211
2	GEM 312	GEOPHYSICS I	3	
3	GEM 313	IGNEOUS PETROLOGY	2	GEM 214 & GEM213
4	GEM 314	METAMORPHIC PETROLOGY	2	GEM 214 & GEM 213
5	GEM 315	SEDIMENTARY PETROLOGY	2	GEM 214
6	GEM 316	MINERAL ECONOMICS	2	GEM 221
7	GEM 317	GEOCHEMISTRY	2	GEM 213
8	GEM 318	FIELD GEOLOGY II	3	GEM 226
9	GEM 319	MINERAL PROCESSING	2	GEM 224
10	ESP 311	ENTERPRENEURAL DEVELOPMENT	1	
		TOTAL CREDIT UNITS	**21**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

2NDSEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 329	SIWES	6	
		TOTAL CREDIT UNITS	**6**	

400 LEVEL

1STSEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 411	PETROLEUM GEOLOGY	2	
2	GEM 412	APPLIED GEOCHEMISTRY	2	

3	GEM 413	SURFACE MINING	2	
4	GEM 414	HYDROGEOLOGY	2	
5	GEM 415	FIELD GEOLOGY III	3	GEM 318
6	GEM 416	PHOTOGEOLOGY AND REMOTE SENSING	2	
7	GEM 417	MINE VALUATION	2	
8	GEM 418	GEOLOGY OF NIGERIA AND AFRICA	2	
9	GEM 419	ENGINEERING SURVEYING	2	GEM 216
		TOTAL CREDIT UNITS	**19**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

ELECTIVES

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS
1	GEM 431	BASIN ANALYSIS	2
2	GEM 432	GEOSTATISTICS AND DATA ANALYSIS	2

2ND SEMESTER

S/N	COURSE CODE	COURSE TITLE	CREDIT UNITS	PREREQUISITES
1	GEM 421	PALYNOLOGY	2	
2	GEM 422	APPLIED GEOPHYSICS (WELL LOGGING)	3	GEM 312
3	GEM 423	ROCK MECHANICS	2	
4	GEM 424	ENGINEERING GEOLOGY	2	
5	GEM 427	SEMINAR IN GEOLOGY	2	
6	GEM 428	RESEARCH PROJECT	6	GEM 313, GEM 314, GEM 315 GEM 318 & GEM 415
		TOTAL CREDIT UNITS	**18**	
		MAXIMUM CREDIT UNITS FOR THE SEMESTER	**24**	

COURSE CONTENT

GEM 111: INTRODUCTION TO GEOLOGY I (2 CREDITS)

Geology and sub-disciplines. Origin and development of the solar systems. The earth's surface and interior. Minerals, their crystals morphology. Physical and chemical properties. Some common rock forming minerals. The major classes

of rocks, brief description of types and constituents of minerals and formative processes; Surface processes and products; Streams and their features, mass movements, glaciers and glacial features, wind erosion and deposition. Sub-surface water and associated features-sink holes, karsts, etc. Description and identification of some common minerals and rocks. ***Introduction to the geology and principles***

in the field around the University town and environs and later (if possible) to places of (peculiar) geological interest for 10 days.

GEM 121: INTRODUCTION TO GEOLOGY II (2 CREDITS)

The geologic time scale. Records of life forms and important geologic events (processes). Dating methods in Geology. Earth's gravitational force; magnetism of the earth. Elastic properties of earth material, earthquakes and effects. The theory of plate tectonics - continental drift, sea floor spreading and causes of plate motions. Mining,mineral and energy resources.

GEM 211: INTRODUCTION TO STRUCTURAL GEOLOGY/MAP INTERPRETATION (2 CREDITS)

Introduction to the principles of rock deformation. Folding and classification of folds. Linear and planar structures in tectonics. Faults and joints. Geologic maps: Width of outcrops of strata, dip of strata from contact patterns across valleys, three point problems. Distribution of rock units of different ages in folds. Convergence of stratigraphic contacts against angular unconformities, offset of dipping strata across faults and the relative ages of rock units on upthrown and downthrown blocks. Concordant and discordant relationship of igneous rocks in sedimentary strata. Section drawing and interpretation of sequences of events.

GEM 213: CRYSTALLOGRAPHY AND MINERALOGY (2 CREDITS)

Principles of crystal chemistry, physical and determinative properties of minerals; systematic mineralogy, silicate structures, description of common rock forming minerals. Formation of crystal, crystalline state, law of crystallography, space lattices and unit cell, crystallographic notation, seven crystal system and 32 classes of crystal symmetry, crystal defects, twining and twin law.

GEM 214: INTRODUCTORY PETROLOGY (2 CREDITS)

The more common igneous, sedimentary and metamorphic rocks, their classification, texture. Characteristic features. Megascopic and microscopic textures and their classification. Elements of optical mineralogy and identification of common rock forming minerals under polarizing microscope.

GEM 215: STRATIGRAPHY (2 CREDITS)

Geology as a practical science. Historical geology. Time and measurements. Principles of stratigraphy. The stratigraphic code and nomenclature. Biostratigraphy, Lithostratigraphy and Chronostratigraphy, Stratigraphic correlation. The Geological Column and Time Scale. Index fossils, Extinctions in the stratigraphic record. Stratigraphy of Nigeria. Stratigraphic analysis. Application of stratigraphic principles. Dynamics in the stratigraphic record; transgression – regression. Facies sequences and genetic units. Field mapping techniques and interpretation of stratigraphic data. Cyclicity in the stratigraphic record using examples of the Quaternary as the key to the past. Nigerian stratigraphy and palaeogeography.

GEM 216: INTRODUCTION TO MINING GEOLOGY (2 CREDITS)

Minerals and mining acts of Nigeria. The ministry of solid minerals development and its organs. Ore and mineral: Some economic minerals and their uses, Mining terminologies (unique terms and expression used in mining), Mining and mining stages in the life of a mine (overall sequence of activities in

modern mining) prospecting, exploration, development, exploitation and reclamation, Unit operation of mining (rock breakage and material handling) production cycle.

GEM 221: INVERTEBRATE PALEONTOLOGY (2 CREDITS)

Characteristics, identification, classification of major phyla. Arthropoda, Mollusca, Coelenterata,Porifera, Brachiopoda, and Protozoa. Their evolution, paleoecology and stratigraphic significance.

GEM 222: OPTICAL MINERALOGY (2 CREDITS)

Mineral preparation for microscope study. Describing and identifying the parts of the petrological microscopes, study of the optical properties of minerals-nature,light, refractive index, double refraction uniaxial minerals and their interference figures, optically biaxial minerals and their interference figures, the nicolprism, minerals between crossed nicols, vibration-direction and optic orientation, pleochroism and absorption, synopsis of examination and observatory features of minerals under the petrological microscope. Identification and study of mineral groups-oxides and hydroxides, carbonates, borates, sulphates, phosphates, silicates.

GEM 223: ENVIRONMENTAL GEOLOGY (2CREDIT)

Pollution and its sources, hazards and control. Prediction and control of geologic hazards:Earthquakes, Volcanoes, landslides, mudslides, Erosion, Floods, desertification. Earthquake monitoring, greenhouse effect, Air and water pollution, Oil spills and effects, remediation and controls; introductory environmental monitoring and environmental management. Principles of environmental samples analysis, Gas Chromatography (GC) Liquid Chromatography (LC), Mass Spectrometry (MS) Atomic Absorption

Spectrophotometry (AAS),X-ray Fluorescence (XRF); biodegradation and bioremediation. Baseline studies and Environmental Impact Assessment (EIA); Mining and Mining Hazards; Radiation emission and measurements; Principles of industrial health, safety and environment (HSE)**.**

GEM 224: MINERAL RESOURCES/ PROCESSING (3 CREDITS)

Metallic and non-metallic resources: composition, distribution and utilization. Fossil fuels, surface and underground water hydrology. Introduction to principles in mineral processing (communition and concentration).

GEM 226: FIELD GEOLOGY I (2 CREDITS)

Techniques of field observation and the recording of geological data in the field. Identification of common rocks types in the field. Systematic geological mapping are carried out around the University town and environs at preliminary stages for at least 20 days and geological map produced. Another 10 days (including 2 days journeys to and fro) of field work is carried out in area of specialized geological interest in the country, e.g. to the Sokoto Basin or Bornu Basin, Benue Trough, mining Camps and industries etc. Each student would submit a written report at the end of the course.

GEM 311: STRUCTURAL GEOLOGY (2 CREDITS)

Mechanics of deformation; force, stress and strain; rock properties and environmental factors affecting deformation e.g. pressure, temp. Time, grain size mineral composition, fluid contents, structural types and association; origin and classifications and other minor structure and their interpretation. Structural associations. Stereographic projection **(л, β-Diagrams).**

GEM 312: GEOPHYSICS I (3 CREDITS)

Nature and scope of geophysics and geological applications of common geophysical exploration methods (mineral, petroleum and water exploration).

Gravity and magnetic methods, Induced Polarization (IP) methods, Electrical Resistivity and Electromagnetic methods, Seismic methods and radioactive methods.

GEM 313: IGNEOUS PETROLOGY (2 CREDITS)

Extrusive and intrusive igneous processes, associations of igneous rocks in space and time, phase equilibria and the genesis of selected igneous rocks. Practical to include optical study of different igneous rock types and texture.

GEM 314: METAMORPHIC PETROLOGY (2 CREDITS)

Factors of metamorphism. Metamorphic grades with emphasis on P-T conditions and effects. General characteristics of metamorphic terrains. Field relationships. Practical to include optical study of different metamorphic rock types and texture.

GEM 315: SEDIMENTARY PETROLOGY (2 CREDITS)

Origin of sedimentary processes, dynamics of fluids, concept of particle size grade scales, methods of size analysis, grain distribution and interpretation, qualitative and statistical study of texture, structure and composition of sedimentary rocks. Description of sedimentary rock types, study of digenetic processes, recognition of sedimentary environments from rocks records.

GEM 316: MICROPALEONTOLOGY (2 CREDITS)

General morphology, classification, geological history and applications of microfossils; with special emphasis on foraminifera, ostracods, radiolarians, diatoms, conodonts, coccoliths and briefly palynomorphs. Their use in biostratigraphy and paleoecology.

GEM 317: GEOCHEMISTRY (2 CREDITS)

Origin of the earth and the solar system. Structure and composition of the earth. Distribution of elements in cosmic systems; meteorites, lithosphere, hydrosphere, biospheres, and atmosphere.

GEM 318: FIELD GEOLOGY (3 CREDITS)

This is taken to practice basic methods of geological mapping and recording in the field for at least 25 days duration. Routine observation and collection of data to produce geological map. Each student in group is allocated a portion of about 8km x 5km (40 sq km) area (scale: 1:12,500) to map the geology. Each student is expected to submit a report (2 light- bound copies) at the conclusion of the course.

GEM 319: MINERAL PROCESSING (2 CREDITS)

Fundamental principles in mineral processing, communition, crushing and grinding as tools for liberating of mineral particles. Sizing screening, classifying and cycloning processes as prelude to separation. Hand sorting, mechanical sorting, principle, gravity concentration, jigging table wet and dry) slicing etc. Magnetic separation, high tension separation, dense media separation, floatation principles.

GEM 411: PETROLEUM GEOLOGY (2 CREDITS)

The origin, migration and accumulation of petroleum, source rock properties, maturation and degradation of petroleum. Hydrocarbon traps, basic principles of the petroleum system, abnormal pressures, evaluation of petroleum potential, exploration and appraisal methods. Reserve estimation and classification. Petroleum resources of/potentials in Nigeria sedimentary basins.

GEM 412: APPLIED GEOCHEMISTRY (2 CREDITS)

Introductory aspects of exploration geochemistry; Organic geochemistry exploration (Rock-Eval parameters, biomarker geochemistry, organic

petrology); Principles of geochemistry dispersion and reconcentration in rocks and ore systems; Primary dispersion patterns; The migration of economic and pathfinder elements in secondary enrichments; Geochemical soil and stream sediment survey rock geochemistry (lithogeochemistry exploration), geo-botanical investigations; Environmental-health pollution, statistical treatment and interpretation of geochemical data; Geochemical survey in integrated mineral exploration programmes.

GEM 413: ECONOMICGEOLOGY (2 CREDITS)

Principles and processes of formation of ore deposits. The location of ore deposits. Classification of ore deposits based on genesis. Ore deposits of magmatic, hydrothermal/pneumatolytic origin. Sedimentary economic mineral deposits. Basic concept of metallogenic province of Nigeria. The geology and distribution of earth materials.

GEM 414: HYDROGEOLOGY (2 CREDITS)

The hydrologic cycle, hydrologic properties of rocks, occurrence and movement of ground water, types of aquifer, physical and chemical properties of water. Fundamental hydrodynamic laws of ground water and well hydraulics. The Ghyben-Hertyber formula. Exploration and development of ground water resources. Groundwater distribution in Nigeria. practical: Pumping test analysis. Discharge measurements use of current meter. Water level measurements and hydro-geological maps.

GEM 415: FIELD GEOLOGY III (3 CREDITS)

Detailed mapping of selected geological localities on a scale of 1:25 000 with area coverage of 40 $km^2$for duration of 25 days, produce detailed geological map of the area. Here a student is left alone (under a supervisor) to do the self-mapping of the geology. Students are expected to collect as much as possible rocks and material samples for documentation and deposition in the

Geological Laboratory and Museum. A comprehensive report of the field course constitute bases for final year projects for students who wish to use GEM 415 study area as their final year research project. Where the study area is a sedimentary basin, the scale of mapping can be smaller than 1:25 000 (e.g. 1:50 000; 1: 100 000 etc.).

GEM 416: PHOTO-GEOLOGYAND REMOTE SENSING (2 CREDITS)

Principles of Photo geology. The use of aerial photographs in photo interpretation. Application of aerial surveying in Agriculture, Engineering and Environmental studies. Principle of remote sensing. Data collection, processing and interpretation. Application of remote sensing in geological investigations.

GEM 417 GLOBAL TECTONICS (2 CREDITS)

Plate tectonics: Magnetic seismic evidence, sea floor spreading, motion of plates on sphere, crustal plate divergence, convergence and continental collision, global earthquake distribution, volcanism and structure.

GEM 418GEOLOGY OF NIGERIA AND AFRICA (2 CREDITS)

An overview of the Basement Complex and Sedimentary Basins of Nigeria. Geology, structure and evolution of African Precambrian rock units and their radiometric ages, development of Phanerozoic interior and coastal basins in Africa.

GEM 419: MINING GEOLOGY (2 CREDITS)

Evaluation of mine prospects. Classification of mineral resources and ore reserve estimation. Mineral economics, mining and regulations.The mining company as business enterprise, Feasibility of mining projects, Mine organization and management. Financial management, case study of the economics of the metallic ore mineral industry.

GEM 431: BASIN ANALYSIS (2 CREDITS)

Sedimentary basin tectonics; classification of sedimentary basins and their plate tectonic settings, lithospheric deformation flexures and resultant basin. Basin stratigraphy, Structure, Isopach and lithofacies maps, sequence stratigraphy, geohistory analysis, formation temperatures and thermal maturity.

GEM 432: GEOSTATISTICS AND DATA ANALYSIS (3 CREDITS)

Elementary statistics (probability, statistics, testing normal population. T test, F-test, analysis of variance X^2 test). Matrix Algebra (types of matrix elementary matrix operations determinants quadratic forms, latent roots and vectors). Analysis of sequences of data, least methods, regression analysis. Time trends analysis. Autocorrelation programme writing in BASIC/FORTRAN/PASCAL, Review of commands functions, array manipulation of flow charts preparationsubroutines, loots, debugging. Practical on programme writing of some mathematical/statistical equations useful in geology.

GEM 421: PALYNOLOGY (2 CREDITS)

Morphology and classification of pollen and spores; their stratigraphic and paleoenvironmental interpretations. Applications to forensic investigation/criminology, medicine, coal and petroleum exploration.

GEM 422: APPLIED GEOPHYSICS (WELL LOGGING) II (2 CREDITS)

Well logging: principles, lithology, caliper, latero and micro- laterologs, conductivity log, porosity logs, sonic, density compensated density, neutron log, interpretations and applications.

GEM 423: MARINE GEOLOGY (2 CREDITS)

Physical, chemical and biological oceanography. Sampling of ocean floor structure and hypsography of ocean basins. Origin, distribution and age of

marine sediments. Mineral resources of the ocean floor. Coastal erosion and management.

GEM 424: ENGINEERING GEOLOGY (2 CREDITS)

Geologists and engineering, Classification of rocks and soil for engineering purpose, index and engineering purposes of soils and rocks, consolidation and settlement, Bearing capacity, strength characteristics of soils and rocks, factors affecting rock durability, engineering properties of rocks concrete aggregates and quarrying techniques, Elements of soil mechanics, Geological site investigations, foundation problems, building bridges, dam and reservoirs, stability of slopes influence of groundwater on engineering structures, geological aspects of tunneling and route location.

GEM 427: SEMINAR IN GEOLOGY (2 CREDITS)

Each student is expected to prepare and present a seminar on a topic relevant to the intended area of research. Students are obliged to attend all seminars to qualify for seminar credit.

GEM 428: RESEARCH PROJECT (6 CREDITS)

This also involves independent student mapping (20 days), measurements and collection of data on rocks, minerals, water, soils and sediments for laboratory analysis (instrumental) in a specialized aspect of geology. Students shall present whole/part of their project work as oral (internal) defence for comments and observations. Loose bound copy of report/thesis are produced for external assessment/oral defense and subsequently the hard bound copy submitted.

EMPLOYMENT OPPORTUNITIES FOR GEOLOGY AND MINING GRADUATES

(1) Oil and gas companies

(2) Mining companies

(3) Iron and steel companies

(4) Water supply agencies

(5) Construction companies

(6) Federal government ministries and parastatals:Federal ministry of solid minerals development; water resources; petroleum resources;works; housing; agriculture; Steel raw materials exploration agency Kaduna; National metallurgical development centre, Jos; Raw materials research and development council

(7) Teaching and research

(8) UNICEF, UNIDO, UNDP, amongst others.

ADDENDUM

The following field equipment are mandatory for students to acquire for their use upon registration.

1. Geological hammer
2. Compass Clinometer
3. Laboratory coats
4. Camp bed
5. Hand lens.