

**DELTA STATE UNIVERSITY,  
ABRAKA**



*Department of Biochemistry  
Student Information Hand Book  
With  
Revised B.Sc. Biochemistry Curriculum  
(2019/2020)*

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**THE VISITOR, CHANCELLOR, PRO-CHANCELLOR AND PRINCIPAL  
OFFICERS OF THE UNIVERSITY**

**THE VISITOR**

His Excellency, Sen. Dr. Ifeanyi Arthur Okowa  
Executive Governor of Delta State of Nigeria.

**CHANCELLOR**

Hon. Justice Godwin Adolphus karibi-Whyte, JSC (Rtd)

**PRO-CHANCELLOR**

Professor Sam Oyovbaire

**VICE-CHANCELLOR**

Professor A.O. Egwunyenga  
B.Sc. (Lagos), MSc & PhD (Jos)

**DEPUTY VICE-CHANCELLOR (ADMINISTRATION)**

Professor S.O. Asagba  
B.Sc. (Benin), M.Sc. (Lagos) & Ph.D. (Benin)

**DEPUTY VICE-CHANCELLOR (ACADEMIC)**

Professor (Mrs) G.N. Ojie-Ogwu  
NCE (Abraka), B.Ed (Benin), M.Ed (Benin), MBA (Nigeria), M.A. (Nigeria), Ph.D.  
(Nigeria)

**PROVOST ASABA CAMPUS**

Professor E.P. Oghuvbu  
NCE (Abraka), B.Ed (Benin), M.Ed (Benin), Ph.D. (Abraka)

**PROVOST OLEH CAMPUS**

Prof. IFO ALEX AMATA

**REGISTRAR**

Mr. Daniel A. Urhibo  
B.Sc.(Hons) Uniport, MIRL (DELSU), MANUPA, FICA, FIPND

**BURSAR**

Mr. Justice O. Egbare, FCA, MBA

**UNIVERSITY LIBRARIAN**

Professor Stephen O. Uwaifo (CLN)  
NCE (Abraka), BALS, MLS (BUK), Ph.D. (Ibadan)

### Staff List (Academic and Non-academic)

S/No.	Name of Staff	QUALIFICATIOIS	STATUS	Category of Staff(e.g. Adjunct, Visiting, Sabbatical, Part-Time)
1	Prof. Betty Omenebelle George	B.Sc.(Kumasi), M.Sc., P.hD.(Ibadan)	Professor (Nutritional Biochemistry/Clinical Nutrition)	Full Time
2	Prof. George E. Eriyamremu	B.Sc., (Ilorin), M.Sc., (Benin), Ph.D (Benin)	Professor (Nutritional Biochemistry)	Sabbatical
3	Prof. S.O Asagba	B.Sc., (Benin), M.Sc., (Lagos), Ph.D (Benin)	Professor (Biochemical Toxicology)	Full time
4	Prof. Nyerhovwo John Tonukari	B.Sc., (Maduguri), M.Sc., (Ibadan), Ph.D, Michigan	Professor (Molecular Biotechnology)	Full Time
5	Prof. Innocent Onyesom	B.Sc.( Ekpoma), M.Sc., (Benin), Ph.D (Port Harcourt)	Professor (Medical Biochemistry)	Adjunct
6	Prof. Fidelis Ifeakachuhu Achuba	B.Sc., M.Sc., (Benin), Ph.D (DELSU)	Professor (Biochemical Toxicology & Ecotoxicology)	Full Time
7	Dr U E Uzuegbu	MBBS( Abia)	Senior Lecturer(Medical Biochemistry)	Adjunct
8	Dr ( Mrs) A O Opajobi	MBBS( Ilorin)	Senior Lecturer(Medical Biochemistry)	Adjunct
9	Dr. Helen Ejiro Kadiri	B.Sc., M.Sc., (Lagos), Ph.D (DELSU)	Senior Lecturer (Nutritional Biochemistry)	Full Time
10	Dr. Akpovwehwee Akporhwarho Anigboro	B.Sc., M.Sc. (Benin) (Lagos), Ph.D (Port Harcourt)	Senior Lecturer (Enzymology/ Biotechnology)	Full Time

11	Dr. J C Mordi	B.Sc., M.Sc, (DELSU), Ph.D (Ilorin)	Senior lecturer	Adjunct
12	Dr A. T. H Mokogwu	A.M.L.S.C, F.M.L.S.C. M.Sc Biochemistry( Jos) Ph.D ( Ekpoma)	Senior Lecturer Clinical Biochemistry	Adjunct
13	Dr. Israel Oghenevwodokohw o Okoro	B.Sc., (DELSU), M.Sc., (Benin), Ph.D (Zaria)	Senior Lecturer (Nutritional/ Biochemical Toxicology)	Full Time
14	Dr. D. A. Ehwarieme	B.Sc., (DELSU), M.Sc., (Benin), Ph.D (DELSU)	Senior Lecturer (Microbial Genetics)	Adjunct
15	Dr. (Mrs) O. S. Egbule	B.Sc., (DELSU), M.Sc., (Benin), Ph.D (DELSU)	Senior Lecturer (Microbial Genetics)	Adjunct
16	Mr P.E. Awhin	B.Sc. (DELSU), M.Sc. (Benin)	Lecturer I( Medical Biochemistry)	Adjunct
17	Dr. Eferhire Aganbi	B.Sc., (DELSU), M.Sc., Ph.D, (Essex), PGDCE (Nottingham)	Lecturer I (Nutritional/ Biochemical Toxicology)	Full Time
18	Dr. Augustine Apiamu	B.Sc. (DELSU), M.Sc. (Benin), Ph.D (DELSU)	Lecturer I (Environmental Biochemistry & Toxicology)	Full Time
19	Dr ( Mrs) Theresa Ezedom	B.Sc. (DELSU), M.Sc. (Ibadan), Ph.D (DELSU)	Lecturer II (Clinical Toxicology)	Adjunct
20	Dr ( Mrs) Evelyn Ojugbali	MBBS (Nsukka)	Lecture II (Medical Biochemistry)	Adjunct
21	Dr ( Mrs) Onobrudu	B.Sc. (DELSU), M.Sc. (Port Hacourt), Ph.D (Port Hacourt)	Lecture II (Medical Biochemistry)	Adjunct
22	Mr. Pere-Ebi Toyola	B.Sc. (Ibadan), M.Sc. (Ibadan)	Assitant Lecturer (clinical Toxicology Biochemistry)	Adjunct
23.	Mr. Innocent Ogheneovo Orhonigbe	B.Sc. (Ekpoma), M.Sc. (Nsukka)	Assitant Lecturer (Pharmaceutical Biochemistry)	Full Time

	Bethel U S Oghenejobo	B.Sc. (Benin), AIMLS	Assistant Chief Lab. Scientist	Adjunct
	Rume G. Kweki	B.Sc., M.Sc. (DELSU), AISLT	Principal Lab. Technologist	Adjunct
	Edith O Okoro	B.Sc., M.Sc. (DELSU), AIMLS	Scientist I	Adjunct
2	Mrs. Oghenevwehre Philomina Omomaife	WASC 1994, OND 2000	Technologist II	Full Time
13	Mr. Patrick Chukwuyenum Ichipi-Ifukor	B.Sc., M.Sc. (DELSU), AISLT	Technologist II	Full Time
14	Mrs. Lilian Oberhiri	WASC NABTEB ( Adv )	Snr. Lab. Supervisor	Full Time
	Mr Chimkwanum Godwin	WASC	Laboratory Supervisor	Adjunct
	Mr Ishiekwene George	G.C.E, NECO	Laboratory Supervisor	Adjunct
15	Mrs. Gladys Dogboro	SCCE, NECO B.Sc ( DELSU)	Executive Officer	Full Time
16	Mr. R.S.O. Iwemjiwe	SSC, 1994/1999, OGT, Auchi (Adv.) 1998, Diploma in Computer Application, DELSU, 2002, B.Sc. 2008, ND, Sec. Admin, 120 wpm Shorthand, Typewriting, 50 wpm 2008.	Assistant Chief typist	Full Time
16	Mrs. Oghenevo Omare	FLSC	Messenger/Cleaner	Full Time

## **Goodwill message from the Head of Department Welcome!**

I wholeheartedly welcome all stakeholders, staff and students, old or new to the Department of Biochemistry.

The Department of Biochemistry came into being in 1993 and has over the years grown tremendously. The Department is endowed with many professors and lecturers in various areas of specialization. These erudite scholars are well-grounded in impacting biochemistry principles, innovative practical sections in both undergraduate and postgraduate students. The laboratories are well-equipped with state-of-the-art equipment and apparatus. No wonder the Department was accorded full accreditation by the National University Commission (NUC) (2015-2020). This has provided the platform for all-round training of our stale, fresh and prospective students. The employment of our outputs in both the private and public sectors of the economy attest to this assertion.

This handbook contains relevant information required for the students through fare in their sojourns in the Department of Biochemistry. Besides, the handbook contains the course contents and workloads per semester/session. Therefore, students are enjoined to make careful read so as to adhere to the rules and regulations. May you all have a hitch-free and rewarding experience in the Department of Biochemistry.

Yours in the journey

Professor Fidelis Ifeakachuku Achuba  
Head of Department





## NOTES ON UNIVERSITY LOGO

### (A) SHAPES INCORPORATED IN THE DESIGN

- (i) The overall circular shape represents the cognate and holistic relationship of the constituent parts of the state.
- (ii) The book represents academic knowledge and research.
- (iii) The ornamental ivory tusks represent the culture upon which all knowledge must be predicated.
- (iv) The derrick represents the mineral endowment of the state.
- (v) The broken lines represent water which is a prime feature of the state.

### (B) COLOURS INCORPORATED IN THE DESIGN

Three colours are incorporated in the University Logo. They are Sky Blue, Prussian Blue and Black

- (i) Sky blue represents water which is found in abundance in the State.
- (ii) Prussian blue is generally a colour for love which can lead to peaceful search for knowledge and truth.
- (iii) Black represents the “black gold” (oil) which constitutes the bulk of the state’s economy and prosperity.

**MOTTO:** Knowledge, Character, Service.

## **A BRIEF HISTORY OF THE UNIVERSITY**

Delta State University was established on 30<sup>th</sup> April, 1992 by the then Executive Governor of the State, Olorogun Felix O. Ibru. It was announced that the University would start off with five Faculties, namely: Education, Agriculture, Arts, Science and the Social Sciences. Besides Abraka, there would be the Asaba Campus, while four of the Faculties were to be located at Abraka, the fifth, the Faculty of Agriculture, was to be at Asaba Campus. Ten Faculties have since been established accordingly and are in full operation with 53 departments and offering about 64 degree programmes. Delta State University, though new and one of the youngest in Nigeria has a long and impressive history as a centre of education. It metamorphosed from the renowned Government Teachers Training College, Abraka, which in the forties produced Grade III and subsequently Grade II Teachers for our schools, to the reputable College of Education which awarded the Nigerian Certificate of Education. Later, in affiliation to the University of Benin, it offered degree programmes until 1985 when it became a Faculty of Education of the then Bendel State University, Ekpoma. It became an autonomous University in April, 1992, and the conversion of the Ekpoma Campus to Edo State University in December, 1991. However, in an amendment to the law establishing the University in 1992, the State Government established a third Campus of the University at Oleh that is the Faculty of Law.

The establishment of Oleh Campus brings to force the state Government's policy in having a campus of the University in each of the three Senatorial Districts of the State.

With Abraka as the Main Campus of the University, the Academic Programmes of the University are distributed as follows:

### **ABRAKA CAMPUS**

- (a) Education
- (b) Arts
- (c) Social Science
- (d) Pure Science
- (e) Medical Science

### **ASABA CAMPUS**

- (a) Agriculture
- (b) Management Science
- (c) Environmental Studies

## **OLEH CAMPUS**

(f) Pharmacy

(a) Law

(b) Engineering

### **Philosophy**

The training in Biochemistry is designed to cover all the physico-chemical and molecular processes upon which life is based. This means exposing students to an understanding of the physical and chemical nature of the substances in living things, particularly in our environment and the molecular basis of their interaction with one another.

### **Objectives**

The courses are designed to achieve the following:

- (a) Provide a good background in physical, biological and mathematical sciences and their relationship especially as they affect the study of living things;
- (b) Provide appropriate training to students from other departments in the university, who may require a working knowledge of Biochemistry;
- (c) Provide the students with necessary skills required for specialized training in basic and applied Biochemistry at higher degree levels;
- (d) Prepare the students to adequately take up opportunities and contribute meaningfully to pharmaceutical innovations in medical and food/nutrition research, brewing, agriculture and biotechnology; and
- (e) Prepare the students to serve in hospital laboratories, marketing and commerce, and in Government organizations such as in scientific sections of civil service, public health laboratories and research institutions.

### **Admission Requirements**

Candidates should possess the G.C.E. O/L or SSCE or its equivalent with credit passes in at least five subjects which should include English Language, Mathematics, Physics, Chemistry and Biology.

- (i) In addition to the admission requirements stated above, students seeking admission into the 4-year degree programme should enter for

the following courses in UTME: English Language, Biology, Chemistry, and Physics.

(ii) Those that have successfully completed the pre-degree programme of Delta State University may be admitted into the 4-year degree programme in Biochemistry.

(iii) Candidates wishing to transfer from other Universities may be considered for admission at the appropriate level provided such candidates meet the departments- minimum admission requirements.

(iv) The 3-year degree programme is for direct entry candidates who must in addition to the 'O' Level requirements, possess 'A' Level passes in Chemistry and Biology or Zoology/Botany. On admission, direct entry candidates must complete ALL University generic and faculty courses relevant to their training in Biochemistry

Programme/Sub-discipline/Discipline Structure to include period of formal studies in the Universities Industrial training planned visit and research projects:

## **ACADEMIC REGULATIONS**

### **1. Matriculation**

Any student admitted into the University for the first time to pursue a degree or diploma programme (including transferred students) will be required to matriculate. Such a student must have registered for his/her course of study. Matriculation involves taking a matriculation oath and signing the matriculation register. Until this is done the student shall not be regarded as a bonafide student of the University.

### **2 (a) Deferment of Admission**

On admission into the University for a particular session, a candidate who, for any reason is unable to take up the offer may apply in writing to the Registrar for the deferment of his/her admission. Such a student must matriculate and pay the prescribed acceptance fee before making the application. The student should in addition pay the approved deferment fee. The period of deferment should not be more than one session. The application should include evidence of payment of the prescribed fees. Such application should reach the Registrar not later than one month after matriculation for the given session. If the Registrar is satisfied that the student is eligible for matriculation/registration in the University, he processes and sends the application to the faculty concerned for onward recommendation to Senate.

### **2(b) Temporary Withdrawal from Studies**

Only students who have matriculated and duly registered in the University for a minimum period of one semester are eligible to apply for temporary withdrawal from the University.

Such applications containing the details of studentship should be routed through the Head of Department to the Dean of the Faculty for necessary and recommendation by the Faculty Board to Senate.

The period of temporary withdrawal from the University by a student shall normally not be more than one academic year.

The Registrar shall convey the decision of the Senate to the student immediately.

### **3. Transfers**

#### **(i) Inter-University Transfer**

All candidates seeking admission into the University by transfer from other Universities should purchase the prescribed form from the Academic Office after paying and obtaining a Bursary receipt for the fee paid. The duly completed form should be submitted along with the transcript of academic records to the Admission Office at least two weeks before the matriculation date for that session. On receipt of the forms, the Admissions Office processes and sends them to the appropriate Dean of Faculty/Head of Department for their consideration and recommendation to the Secretary, University Admissions Board who collates and forwards them to the University Admission Board for consideration. The Admissions Office must ensure that all transcripts are properly verified and confirmed authentic and that no student coming from other University is a cult member. Inter-University transfer should normally be allowed up to 200 level.

#### **(ii) Inter Faculty/Intra Faculty Transfer**

Students wishing to transfer from one Faculty/Department to another must satisfy the University and Faculty/Departmental requirements. In addition, they must have taken at least three core courses in their 100 level in the case of Intra Faculty Transfer. When such transfer is eventually affected, the students must register all the remaining 100 level core courses in addition to their 200 level courses.

Inter Faculty and Intra-Faculty transfers may not exceed 10% of the student population in either case for a given session.

### **4. Classification of Courses**

#### **(i) Core Courses**

A core course is a compulsory course that must be taken and passed before graduation and should be included in the computation/classification of degree results as in NUC guidelines.

**(ii) Pre-requite**

A pre-requite is a course, the knowledge of which is required prior to the taking of another specified course. A student is deemed to have obtained this pre-requite knowledge if he/she obtains a mark less than 30% but will not be credited with any Grade point in the course concerned except he/she scores a minimum of 45%. This particular clause is without prejudice to Faculty requirements.

**(iii) Elective**

Elective courses are optional courses within or outside a discipline, from which students may choose a number for the purpose of fulfilling the minimum requirements for the award of degree or for the purpose of broadening their horizons. They may be chosen with the assistance of the Head of Department of Departmental/Level Adviser.

**(iv) General Studies**

These comprise Use of English and Library, Logic, Philosophy and Human Existence, History, Philosophy of Science and Technology, Nigerian People, Culture and Environmental, Introduction to Computer. They must be taken and passed before graduation.

## 5. The Course Credit Unit System

- (i) All Faculties in the University operate the course unit system.
- (ii) Each course unit shall have alphabet to indicate the subject area and levels of course representing the years for the degree programme.

**The numbering system is as follows:**

<b>Course Code</b>	<b>Level</b>	<b>First Semester</b>	<b>Second Semester</b>
BCH	100	101 – 109	111 – 119
BCH	200	201 – 209	211 – 219
BCH	300	300 – 309	311 – 319
BCH	400	401 – 409	411 - 419



1<sup>st</sup> digit denotes level or year of study; 2<sup>nd</sup> digit even numbers (i.e. 0) denote first Semester Courses; odd numbers (i.e. 1) denotes Second Semester; while 3<sup>rd</sup> digit denotes the sequence (in the series) of courses in the department/degree option ranging from 1-9.

- (iii) A course unit is the equivalent of one lecture/tutorial hour per week per semester each credit commensurate with the load allocated to a unit of one hour. Thus, one three-hour laboratory/practical class per week per semester earns 3 units.
- (iv) Where a course is sessional, the contact hours double those based on semester system provided that the approved contact hours are maintained.
- (v) Where a source is offered three hours in a week for a whole session of two semesters, the credit unit lead assignable to such a course shall be 6 units. If, however, the contact is four hours a week for a session of two semesters, the credit lead is 8 units.
- (vi) Course failed in one semester are carried over to, and registered for in subsequent semesters.
- (vii) In course unit system, students may not repeat an entire year but can repeat only those courses which they failed and for which they need fulfill some requirements. Such failed courses must be registered first before the present level courses provided they do not register for more than the approved 48 credit units per Session. Failed elective course(s) need not be repeated. However, core courses must be repeated until they are passed.
- (viii) High premium shall be placed on projects, and, where applicable on Industrial Training and Teaching Practice.
- (ix) A class Admit/Grade Card shall be issued to every student for cash course registered for during the session. The card shall enable the lecturer in-charge of a particular course to be able to exercise control over attendance at lectures. It shall also be used for submission of grades scored in the examinations along with the grade point. Lecturers shall be required to certify that a student has attained a minimum of 75% contact hours before he/she is allowed to take the examination in the particular course.

## **6. Registration**

- (i) It shall be mandatory for all students to register for courses at the beginning of the session in accordance with the University's rules made from time to time as approved by senate.
- (ii) All students shall register for courses within three weeks of the commencement of the first semester of each session.
- (iii) A student shall be deemed to have begun his/her course of study on the date of his/her registration of that course.
- (iv) Late registration may be allowed up to the end of the fourth week after the commencement of the semester. This will be only in exceptional cases with the approval of Head of Department, the Dean of the Faculty and the Registrar and on payment of the late registration fee at that time.
- (v) Student may change, add or delete particular course within the first three weeks after the commencement of the semester. No course will be added or deleted four weeks after the commencement of the semester. Any change of course form submitted after this period shall be discountenanced.
- (vi) A student who fails to register for courses at the end of the fourth week of the semester shall be deemed to have withdrawn from the University.
- (vii) After registration for courses at the beginning of the semester, a student needs not register for examination.
- (viii) An extension student shall be required to register for only the courses failed or carried over. This is subject to the conditions for withdrawal and probation.

## **7. Work Load**

- (i) Every full-time student shall be required to register for minimum of 15 credit units and maximum of 24 credit units per semester. Total units per session shall not be less than 30 and more than 48.
- (ii) Each final year student is required to undertake a project which will earn him/her between 4 and 6 units. A student who fails to complete

hid. her project or whose project is rejected will have to complete/rewrite it and submit before graduation. Such a project shall not score more than a “C” grade. However, such a student has the option of registering for, and completing the project in the following session. In that case, the project will be treated as a first attempt.

## 8. First Degree Programme

- (i) Programmes of study shall be provided leading to Bachelor’s Degree to be denoted by letters as indicated below:

S/N	FACULTY	TYPES OF DEGREE
a.	Science	B.Sc (Hons) e.g B.Sc (Hons) Biochemistry

- (ii) The Degree shall be awarded with Honours.
- (iii) Instruction shall be by courses and students shall be required to register for and take an approved combination of courses as stipulated by Senate on the recommendation of the Faculty Board.
- (iv) At the beginning of the Programme, each student shall be assigned course adviser by the Head of Department.
- (v) A staff of the University or any person approved by the Registrar on the advice of the Head of Department and the Dean of the Faculty may audit course(s) on payment of prescribed fee.
- (vi) Unaudited student shall not be allowed to write the University examination and shall not be credited with any work done.
- (vii) No student shall qualify for the award of an Honours Degree of the University if he/she spends more than two sessions beyond the normal period allowed for the Programme. Such as student shall be awarded a pass degree. For instance a 4-year degree programme should not exceed 6 years. Similarly, a 5 year degree programme should not exceed 7 years.

## **9. Duration of Semester**

- (i) The first and second semesters shall each last for between 17 and 18 weeks. This period shall include registration, teaching and examination. Not less than 12 weeks shall be devoted to teaching.
- (ii) Programmes of study for the long vacation period shall last for between 11 and 12 weeks, 8 weeks of which shall be devoted to teaching

## **10. Examination**

### **(a) Procedure**

- (i) University examinations shall be held at the end of each semester for all semester courses and at the end of each session for all sessional courses.
- (ii) Only candidates who are dully registered for courses in a given semester and have met their financial obligations to the University shall be eligible to sit for examination in those courses.
- (iii) To be eligible for an examination, a student is required to attain a minimum of 75% contact hours before he/she is allowed to take the examination in the particular course.
- (iv) Each Faculty shall appoint Faculty Examinations Officer who shall be responsible to the Dean of the Faculty. He shall liaise with the various Heads of Department to ensure that examination questions are set at the appropriate time.
- (v) Every course assessment must consist of continuous assessment of at least 30% and course examination at most 70%. The pass mark for every course assessment is 45%.
- (vi) Where a student repeats a course, the grade points at all attempts must utilized in computing the cumulative grade point average.

### **(b) Absence from Examination**

- (i) Candidates must present themselves at the University examination for which they have registered.
- (ii) Candidates who fail to do so for reasons other than certified ill health or accident or for other reasons acceptable to the Dean shall be deemed to have failed that examination.

- (iii) For the avoidance of doubt, failure to take cognizance of changes in the examination time-table and such lapses on the part of the candidates shall not be accepted as a reasonable excuse for absence.
- (iv) A candidate who falls ill during an examination shall report to the Director of the University Health Services who shall subsequently submit a report in writing to the Dean of the Faculty after treating the candidate.
- (v) A candidate who is unable to take any examination on grounds of illness, confirmed by the University Director of Health services, or on grounds specified in (b) (ii) above may be allowed to sit for the examinations at the next available opportunity.
- (vi) When necessary, on grounds of ill-health and certified by the Director of Health Services, examinations can be taken in the hospital or related locations.

**(c) Examination Malpractice and Disciplinary Action**

- (i) Any student involved in any examination malpractices shall be made to complete the prescribed “Examination Malpractice/Irregularity Form” and submit to the chief invigilator.
- (ii) The Chief Invigilator shall submit in writing to the Dean, report on any examination malpractice within 24 hours after that examination.
- (iii) On receipt of the report, the Dean shall promptly investigate the alleged malpractice.
- (iv) The report/recommendation on each investigation shall within one week be forwarded to the Students’ Disciplinary Committee which shall make appropriate recommendations to Senate.

**(d) Senate Approved Penalties for Examination Malpractice**

- (i) Cheating or spying in examination hall.  
Penalty: Rustication for Two Semesters.
- (ii) Fore Knowledge of Examination questions or the use of prepared examination answers in Hall (leaking)  
Penalty: Expulsion
- (iii) Impersonation in Examination

Penalty: Expulsion

**(e) Instruction to Candidates**

- (i) Students shall not be admitted into the examination hall if they have not been duly registered by the various Faculties as having fulfilled the prescribed conditions of the course of study.
- (ii) Eligible candidates shall report at the stipulated examination halls fifteen minutes before the start of the examination.
- (iii) No candidate shall be allowed into the examination hall 30 minutes after the commencement of examination.
- (iv) No candidate shall be allowed to withdraw from the hall before 30 minutes of commencement of examination.
- (v) Candidates may go to the toilet, during examination provided that they are accompanied throughout the period of absence by a suitable invigilator. Such absence must not be unreasonably prolonged, and the candidate shall not be allowed any extra time by reason of such absence.
- (vi) The chief Invigilator may, under special circumstances, accept a candidate into the examination if he/she is satisfied that there are reasonable grounds for the lateness. A report of the situation must be formally made to the Faculty Examination Officer.
- (vii) Candidates shall not be allowed to bring into examination hall any personal bags, textbooks, scrap notes or such other personal effects, except such materials as may be permitted for use in the same examination.
- (viii) Candidates shall not work out of the examination hall with any answer sheets/booklets used or unused.
- (ix) Candidates shall comply with instructions given by the Chief Invigilator as to the submission of their answer sheets at the conclusion of the examinations.
- (x) It shall be the responsibility of each candidate to ensure that his/her examination sheets are duly accounted for to the Chief Invigilator at the examination hall.

- (xi) All rough notes, scrap sheets, draft answer, etc which do not form part of the definitive answer sheets must be submitted after appropriate cancellation to the Chief Invigilator with the definitive answer sheets at the conclusion of the examination.
- (xii) Candidates shall not talk to one another, give or receive from one another, any form of assistance, pens eraser, pencils, rulers, etc.
- (xiii) All questions pertaining to the examination must be directed to the Chief Invigilator or any of the accredited Invigilators.
- (xiv) The Chief Invigilator shall report any examination misconduct formally to the Chief Examiner/Dean of the appropriate Faculty as specified by Senate.
- (xv) Any contravention of any of the above rules and regulations shall constitute examination misconduct. All candidates shall comply with these regulations in their own interest.

**(f) Instructions to Invigilators**

- (i) Invigilators shall report to the examination hall 20 minutes before the commencement of each examination.
- (ii) Invigilators shall exercise constant and vigilant supervision over the candidates.
- (iii) No person(s) other than the Invigilators, Attendants, Dean of Faculty, Head of Department, Representative shall be allowed into the examination hall, except the course examiner who shall be present during the first 30 minutes and the last 30 minutes of the examination.
- (iv). The sealed envelopes containing the question papers shall only be opened in the presence of the candidates
- (v) In the event of conflict between the time allowed for the examination as indicated on the examination question papers and that on the examination time-table, the time on the question papers shall be adhered to.
- (vi). Invigilators shall tell the candidates the exact time at the start of an examination and thereafter inform them of the time at reasonable intervals.

- (vii) Under special circumstances, the Chief Invigilator shall accept a candidate into the examination hall after 30 minutes of the start of the examination. Cases of admittance after the starting time of the examination shall be reported formally to the chief Examination by the Chief Invigilator.
- (viii) Invigilators shall ensure that personal effects such as bags, textbooks, scrap notes, etc are not brought into the examination hall by the candidates and that unused answer scripts are not taken out.
- (ix) Candidates shall not leave the examination hall until after the first 30 minutes.
- (x) No candidate shall leave the examination hall with the intention of returning without being accompanied by an attendant.
- (xi) Silence shall be maintained throughout the duration of an examination.
- (xii) Invigilators shall ensure that all candidates sign the attendance register.
- (xiii) At the end of an examination, the invigilator shall collect and count the scripts before handing them over to the Chief Invigilator who shall sign answer booklets.



**(g) External Examiners**

The services of External Examiners approved by Senate, shall be required to moderate all final year examinations and in all professional examinations for all 300 level courses and above.

**(h) Submission of Examination Results**

Each department shall compile and compute its results and convene their Departmental Examination Board to consider the results. The results shall be sent to the Faculty Board of Examinations for consideration. The final results as recommended by the Faculty Board shall be presented to Senate for approval.

**(i) Publication of Examination Result**

The Faculty Board shall publish all provisional results. Such results however, shall be in the form of letter grades and for the final year results, professional degree classification.

**(j) Grading**

**A five point grading system shall be adopted as follows:**

<b>Letter Grade</b>	<b>Percentage Score</b>	<b>Grade Point</b>
A	70 and above	5.0
B	60 – 69	4.0
C	50 – 59	3.0
D	45 – 49	2.0
E	0 – 44	0.0

## **(K) Classification of Degree**

The following classification shall be adopted

<b>Grade Point</b>	<b>Class of Degree</b>
4.50 – 5.00	First Class Honour
3.50 – 4.49	Second Class Honours (Upper Division)
2.50 – 3.49	Second Class Honours (Lower Division)
1.50 – 2.49	Third Class Honours
0.00 – 1.49	Fail

- (l) Essential Services during Examination
- (i) The University Health Services shall make first aid facilities available throughout the examination period.
- (ii) The Director of Works and Services shall ensure adequate, functioning of all electrical appliances at all examination venues.

### **11. Maximum Period of Studentship for Graduation**

1. For a student to graduate from any of the programmes in the University, he/she must NOT EXCEED TWICE the minimum period allowed for the programme. The period of rustication, suspension and approved absence from studies shall not count in recording the number of years spent on a programme.
2. To qualify for an honours degree, a student must have spent not more than two sessions beyond the normal (minimum) period allowed for the programme.
3. No student shall be allowed to be on probation more than TWO TIMES on a programme of study in the University.
4. No student shall be allowed to change his/her programme of study more than ONCE during his/her stay in the University.

5. No student in the Diploma Programme shall be allowed to be on probation.
6. At the end of the second session of a Diploma Programme, a student may be allowed one more year of study subject to such a student having minimum C.G.P.A of 1.00. senate also reaffirmed parts of its earlier regulations guiding the award of degree in the University as stated hereunder
  - (i) A student must spend a minimum of two academic sessions in the University to qualify for the award of a degree of the University.
  - (ii) No student shall qualify for the award of an Honour degree of the University if he/she spends more than two sessions beyond the normal period allowed for the programme. Otherwise, such a student shall be awarded a PASS degree. For the avoidance of doubt, a three year degree programme for at most 5 years, 4 years degree programme for at most 6 years (see table below):

<b>Degree Programme</b>	<b>Minimum Years Allowed</b>	<b>Maximum years to Graduate with Honours</b>
3 – Years	3 – Years	5 – Years
4 – Years	4 – Years	6 – Years
5 – Years	5 – Years	7 – Years

## **12. Requirement for Graduation**

To be recommended for any of the degrees of the University, a student must have accumulated not less than 150 units in the 5 years degree programme, 120 units in the 4 year programme and 90 units in the 3 years degree programme. In the case of transfer, students from other recognized Universities, a minimum of 60 units in course approved by the faculty, must

be accumulated by the student. No student who has not spent a minimum of two academic sessions shall qualify for the degree of the University. All Faculties shall work out the spread of courses in all programmes in their areas of jurisdiction.

The weighting system shall be as follows:

### APPROVED SCORING AND GRADING SYSTEM

(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
Vary according to contact hours assigned to each course per week, per semester and according to work student	70-100	A	5	Divided by multiplying I and IV and dividing by total credit units	4.50-5.00	First class
	60-69	B	4		3.50-4.49	Second class Upper
	50-59	C	3		2.50-3.49	Second class Lower
	45-49	D	2		1.50-2.49	Third Class
	0-44	F	0		1.00-1.49	Fail

I. Credit Unit, II. Score, III. Grade IV. Grade Point V. Calculation of Grade Point IV. Grading System VII. Class of Degree

### 13. Incomplete Grading

A student shall be given incomplete grade symbolized by (Inc) if the lecturer did not finish the source or the student did not complete all the requirements for a particular course.

### 14. Normal Progress

A student shall be deemed to be making normal progress if he/she satisfies the requirements of his/her Faculty for the session at the appropriate levels. A normal progress shall mean that the student accumulates a minimum of 30 or 48 units per session depending on the Faculty.

### 15. Carry-Overs

A student shall be made to remain in the University and carry-over the remaining required number of units for normal progress in accordance with the regulation prescribed by the Faculty and approved by Senate.

Students carrying over courses shall not be allowed to register for more than the approved maximum number of units for the session.

## **16. Probation and Withdrawal**

A student who makes a minimum GPA of 1.50 or more at the end of session will proceed to next level of the degree programme for which he is registered.

A student whose CGPA is on the range of 1.00 – 1.49 at the end of one session will be on probation for the following session to enable him/her to improve on the CGPA. During that session, he/she must register for the appropriate courses required and GST courses which he/she has the pre-requisites.

A student on probation during a session who makes a CGPA in the range of 1.00 – 1.49 during that session, must withdraw from the degree programme for which he/she is registered.

## **17. Custody of Confidential Documents**

The officer in-charge of the strong room in the Registry shall be responsible for the following:

- (i) Custody of blank signed University certificates
- (ii) Issuance of certificates to graduates after they had been signed by the appropriate authorities
- (iii) Custody and issuance of examination answer scripts
- (iv) Custody of Department examination results/marks sheets dully signed by the of Department and the Examiner(s) respectively
- (v) Custody of academic gowns, and other matters that are confidential in nature
- (vi) A copy of the examination results approved by Faculty Board of Examinations and signed by the Dean.

## **USE OF FACILITIES THE UNIVERSITY LIBRARY**

As part of the registration exercise, every student must register in the University Library. Thereafter, students should visit the Library regularly and conform to the rules of the Library. Some of these rules are:

- (i) All Library users must show library card before entry is granted into the Library
- (ii) While entering the Library, all personal belongings except purses, note books, private books, and books meant to be returned to the Library shall be deposited by each reader at the property counter.
- (iii) No food or drink is allowed into the Library.
- (iv) Library users are expected to show respect for the rights of others by keeping the Library quiet for study and research. Therefore, all handset, etc. are required to be put off or kept in silent mode while in the Library. No calls should be received in the Library.
- (v) No Library material should be taken out of the building without signing for it at the circulation desk.
- (vi) All Library materials borrowed out are to be returned prompt on due date
- (vii) Library materials are to be treated with proper care whether when borrowed out or when used in the Library.
- (viii) All readers are to surrender their bags and books for inspection security post when leaving the Library.
- (ix) Students who tear pages of books, magazine, journal, newspaper, when caught are to be appropriately sanction. The sanction in this case is expulsion.
- (x) In addition, students should note that any act of misconduct in the Library will attract appropriate sanctions.

## **UNIVERSITY HEALTH SERVICES**

- (i) Every student must register with the University Medical Centre as part of the registration exercise.
- (ii) For any form of ailment, students should report at the University clinic for treatment or advice
- (iii) For official purposes only, the report of the Director of the University Medical Centre is acceptable to the University.
- (iv) Even for treatments received outside the University, the medical report if required for official purposes must be endorsed by the Director of the University Medical Centre.
- (v) At registration, it is important that students disclose in writing any ailment which has been associated with the student e.g Diabetics, Asthma, High-Blood Pressure, Hernia, Sickle Cell. This is to aid the student adequately when such attacks occur.

## **UNIVERSITY COMPUTER SCIENCE LABORATORY**

University Computer Science Laboratory is located in site III. Students must adhere to regulation while using the Computer Science Laboratory for practical purposes.

### **Rules and Regulation in Computer Lab**

- (i) Smoking, eating or drinking is not allowed in the Lab.
- (ii) All parents in the computer Lab are expected to have their school ID with them while in the Computer Lab. Without the ID, the user is requested to leave the Lab immediately.
- (iii) Mobile phones must be switched off at all times.
- (iv) Users are expected to conduct themselves in a responsible and courteous manner while in the Computer Lab.
- (v) Games are strictly prohibited on all computer Lab resources. Students running games will be asked to close the game and leave the Lab or the student IS will be taken and reported to the disciplinary board.
- (vi) Users should not prevent or disrupt another student from using any computer and other facility in the Computer Lab.

- (vii) The papers in these labs are supplied for use in the Lab printers. Any other use is theft.
- (viii) Copying of copyrighted software is illegal and is prohibited in the academic computing facilities or elsewhere on campus.
- (ix) Fighting in the Lab is a punishable offence.
- (x) Lab users are strictly advised to take care of their personal belongings at all times. The University is not responsible and liable to any loss of personal belongings in the Computer Lab.

### Programme Structure

100 Level Courses

First Semester

Course	Code	Title of Course	Units	Status
AEB	101	Principles of Animal Biology	3	C
MTH	101	Elementary Mathematics I (Algebra & Trigonometry)	3	C
MTH	102	Elementary Mathematics II (Calculus)	3	C
CHM	101	General Chemistry I	3	C
PHY	101	General Physics I (Mechanics, Thermal Physics & Waves)	3	C
GST	101	Use of English & Library	4	C
GST	102	Logic, Philosophy & Human Existence	2	C
Sub-Total of Core Courses			21	
Sub-Total of Elective Courses			0	
Total			21	



## Second Semester

Course	Code	Title of Course	Units	Status
BOT	111	General Botany II: Higher Plants	3	C
*BIO	112	General Biology Laboratory	2	C
CHM	111	General Chemistry II	3	C
*CHM	112	General Chemistry Laboratory	2	C
PHY	111	General Physics II (Electricity, Magnetism & Modern Physics)	3	C
*PHY	112	General Physics Laboratory	2	C
GST	111	Nigerian Peoples & Culture	2	C
GST	112	History & Philosophy of Science	2	C
GST	113	Peace Studies & Conflict Resolution	2	C
Sub-Total of Core Courses			21	
Sub-Total of Elective Courses			0	
Total			21	

\*Courses run through both semesters.

## 200 Level Courses

### First Semester

Course	Code	Title of Course	Units	Status
BCH	201	General Biochemistry I	3	C
CHM	201	Physical Chemistry II	2	C
CHM	202	Inorganic Chemistry II	2	C
CHM	203	Organic Chemistry II	2	C
CHM	204	Practical Chemistry	2	C
BIO	204	Biological Techniques	2	C
CSC	200	Introduction to Computer	3	C
CSC	202	Concept of Object Oriented Programming	3	C
BCH	202	Food Science & Technology I	3	E
Sub-Total of Core Courses			19	
Sub-Total of Elective Courses			3	
Total			22	

## Second Semester

Course	Code	Title of Course	Units	Status
BCH	211	General Biochemistry II	3	C
BCH	212	Methods in Biochemistry	2	C
MCB	211	General Microbiology I	3	C
BIO	211	Biostatistics	3	C
BIO	213	Genetics I	2	C
CES	211	Entrepreneurship & Innovation	2	C
BFC	210	Basic French Course	2	C
BCH	213	Food Science & Technology II	3	E
CHM	211	Analytical Chemistry I	2	E
Sub-Total of Core Courses			17	
Sub-Total of Elective Courses			5	
Total			22	

## 300 Level Courses

### First Semester

Course	Code	Title of Course	Units	Status
BCH	301	Metabolism I: Carbohydrates & Lipids	3	C
BCH	302	Metabolism II: Amino acids, Proteins & Nucleic Acids	3	C
BCH	303	General Biochemistry Laboratory	2	C
BCH	304	Enzymology	3	C
BCH	305	Membrane Biochemistry & Bioenergetics	2	C
MCB	302	Immunology	3	C
CHM	301	Physical Chemistry III	2	C
CHM	303	Organic Chemistry III	3	C
BCH	306	Biochemical Reaction Mechanisms	2	E
Sub-Total of Core Courses			21	
Sub-Total of Elective Courses			2	
Total			23	

## Second Semester

Course	Code	Title of Course	Units	Status
BCH	310	Students Industrial Work Experience Scheme (SIWES)	12	C
BCH	311	SIWES Report & Presentation	3	C
Sub-Total of Core Courses			15	
Sub-Total of Elective Courses			0	
Total			15	

**\*N.B.** BCH 310 - Students Industrial Work Experience Scheme takes the whole of 2<sup>nd</sup> Semester and extends into the long vacation for duration of six months. Students are to present their reports in the 1st Semester of the 400 Level.

## 400 Level Courses

### First Semester

Course	Code	Title of Course	Units	Status
BCH	401	Advanced Enzymology & Metabolic Regulations	3	C
BCH	402	Tissue Biochemistry & Bioinorganic Chemistry	2	C
BCH	403	Advanced Biochemical Methods	2	C
BCH	404	Plant Biochemistry	2	C
BCH	405	Industrial Biochemistry	3	C
BCH	406	Molecular Biology	2	C
CHM	401	Instrumental method of analysis	2	C
MCB	407	Microbial Physiology/Metabolism	3	C
BCH	407	Forensic Biochemistry	2	E
BCH	408	Environmental Biochemistry	2	E
Sub-Total of Core Courses			19	
Sub-Total of Elective Courses			4	
Total			23	

## Second Semester

Course	Code	Title of Course	Units	Status
BCH	410	Research Project	6	C
BCH	411	Food & Nutritional Biochemistry	2	C
BCH	412	Biochemical Reasoning & Biosynthesis of Macromolecules	2	C
BCH	413	Pharmaceutical Biochemistry	2	C
BCH	414	Biotechnology & Genetic Engineering	2	C
BCH	415	Seminar in Biochemistry	2	C
CES	311	Entrepreneurial Studies (Business Creation & Growth)	2	C
BCH	416	Clinical Biochemistry	3	E
CHM	434	Industrial Management	3	E
Sub-Total of Core Courses			18	
Sub-Total of Elective Courses			4	
Total			22	

## COURSE DESCRIPTION

### **AEB 111: Principles of Animal Diversity - 3 Units**

General classification of animals, the concept of evolution, characteristic and life history of representative type from each phylum. Ecological adaptation of these form. Practical inclusive.

### **BOT 111: Higher Plants II – 3 Units**

The general morphology, anatomy, histology and physiology of flowering plants, seed structure, dispersal and germination, development of primary and secondary plant body, water relations, photosynthesis, translocation and storage organs, respiration.

### **BIO 112: General Biology Laboratory – 2 Units**

Microscope mounts for identification and illustration of Kingdom Protista/Protozoans. Display, identification and illustration of some representative of Kingdom Animalia; to include Plyla Porifera, Cnidera,

Platyhelminthes, Annelida, Mollusca, Arthropoda, Echinodermata, Hemichordata and Chordata. Basic practical involved Botanical/Plant studies.

### **CHM 101: General Chemistry I – 3 Units**

Atoms, molecules atomic structure and the development of the atomic theory, the nucleus, electronic configuration, chemical bonding; electrovalent compounds, covalent compounds, the dative covalent bond, multiple bonds, factors limiting electrovalency, chemical equations and stoichiometry radioactivity, properties of gases, equilibria and thermodynamics chemical kinetic basic electrochemistry.

### **CHM 111: General Chemistry II – 3 Units**

Periodic classification of the elements, the periodic table, Groups and periods relationship in the table of main group elements, the periodic law, anomalies in the periodic table. Valence forces, structure of solid. Chemistry of selected metals and non-metals. Organic chemistry, definition, history, and classification of organic compounds, nomenclature, and homologous series, functional group (e.g. alkane, alkynes, alcohols, sulphoxides and sulphones): basic stereochemistry electronic, theory in organic chemistry, saturated hydrocarbons, unsaturated hydrocarbons, and importance of organic chemistry. 45h (p).

### **CHM 112: General Chemistry Laboratory - 2 Units**

Acid-base titration. Redox titration, synthesis and preparation of inorganic compounds, analysis of selected anions and cations. Preparation and qualitative of organic compounds, pH measurement. 45h(p).

### **MTH 101: Elementary Mathematics I (Algebra and Trigonometry) – 3 Units**

Elementary set theory's subjects, union, intersections, complements, Venn diagrams. Real numbers, integer, rational and irrational numbers. Mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers; algebra of complex

numbers, the Argand Diagram. De-Moivre's theorem,  $n$ th roots of unity. Circular measures, trigonometric functions of angles of any magnitude, addition and factors formulae.

### **MTH 102: Elementary Mathematics II (Calculus) – 3 Units**

Functions of a real variable, graphs, limits and idea of continuity. The derivative from first principles, as limit of rate of change. Techniques of differentiation. Extreme values, curve sketching, integration as an inverse of differentiation. Methods of integration. Definite integrals. Applications to areas, volumes.

### **PHY 101: General Physics I (Mechanics, Thermal Physics & Waves) – 3 Units**

Units and dimension. Vector algebra. Particle kinematics: displacement, velocity, acceleration, rectilinear motion. Newton's laws of motion, work, energy and power, conservation of energy and linear momentum, impulse, collisions. Uniform circular motion. Rotational motion, relation between equations of linear motion and rotational motion, conservation of angular momentum, moment of inertia. Hydrostatics, Archimedes principle. Surface tension. Fluid flow and viscosity, Poiseuille's law.

### **PHY 111: General Physics II (Electricity, Magnetism & Modern Physics) – 3 Units**

Electric charges and fields, conductors and insulators, charging by friction and induction. Coulomb's law. Electric field and potential. Capacitors and dielectrics, effects of dielectrics, electric current, direct current circuits, Kirchhoff's laws. Magnetic fields of electric current. Torques in magnetic field. Electron-magnetic appliances, ammeters and voltmeters. Induced emfs; Faraday's and Lenz's laws. Self and mutual inductance. Alternating current.

### **PHY 112: General Physics Laboratory – 2 Units**

Laboratory experiments which involves the principles and experimental techniques in mechanics, mechanical properties of matter, heat and thermal

properties, vibration and mechanical waves, optics, electricity and magnetism.

### **BCH 201: General Biochemistry 1 - 3 Units**

Definition of Biochemistry and a short review of the growth of the subject. Chemical characteristics of living things. Classification, nomenclatures, structures and properties of carbohydrates. Classification and chemistry of amino acids, proteins and their derivatives. Methods of isolation and identification of proteins. Acidity and alkalinity, pH and pKa values and their effects on cellular activities. Use of buffers.

*Pre-requisite: BOT 101/ZOO 101*

### **BCH 202: Food Science and Technology 1 - 3 Units:**

The role and scope of food science and technology. Basic nutrition - types of food. Food chain composition and food groups. Malnutrition and associated diseases. Classification, chemical characteristics, function and sources of the different nutrients. Meals, diets and dietary standards. Food spoilage-type, causes and effects on food. Spoilage of different foods. Food poisoning-types, causes, associated diseases and prevention. Food borne diseases.

*Pre-requisite: CHM 111/MCB201.*

### **BCH 211: General Biochemistry II - 3 Units**

Classification, nomenclatures, structures and chemistry of nucleotides and nucleic acids. Nucleic acids-protein supramolecular complexes, Structures and functions of major cell components. Prokaryotic versus eukaryotic organisms. Chemical properties and biological functions of fatty acids, triglycerides, phospho glycerides, sphingo-lipids, waxes, terpenes, steroids and prostaglandins. Lipoproteins and membranes.

*Pre-requisite: BOT 101/ ZOO 101*

**BCH 212: Methods in Biochemistry (Practical and Theory)- 2 Units**

Principles of instrumentation. Theory and application of the following techniques in Biochemistry: Potentiometric filtration, pH determination, Buffer and buffer systems, calorimetry, spectrophotometry, electrophoresis, chromatography, centrifugation and isotopic techniques. Application of the individual techniques in biochemical analysis of tissues and cells, amino acids and proteins, sugars and carbohydrates, fatty acids and lipids, mineral elements and some metabolites should be stressed.

**BCH 213: Food Science and Technology II - 3 Units**

Food processing (traditional and modern methods). Aims and utilization of food like fish, milk, eggs, cereals and grain legumes, fruits and vegetables including tubers. Vegetable oil extraction-palm oil, palm kernel oil, groundnut oil etc. Food preservation-aims, types of high temperature treatments, dehydration or removal of water, use of chemicals and irradiation. Present status and future prospect of food science and technology in Nigeria.

*Pre-requisite: CHM 111*

**BIO 204: Biological Techniques – 2 Units**

Basic research in biology techniques including, manometry, spectrophotometry, chromatography, microscopy, preparation of temporary and permanent slides, the use of microtones, staining techniques, basic microbiology and sterile culture techniques, isotope (tracer) techniques, presentation and interpretation of biological data, (NOTE: The extent of treatment of these techniques depends on the facilities available).

**BIO 211: Biostatistics - 3 Units**

Use of statistical methods in biology. Frequency distributions. Statistics of general tendency. Statistics of variability. Laws of probability. The binomial, poisson and normal probability distributions. Estimation and tests of hypothesis. Design of simple agricultural and biological experiments. Analysis of variance and covariance. Simple regression and correction analysis. Contingency tables, some non-parametric tests.



**BIO 213: Genetics – 2 Units**

Heritable and non-heritable characteristics. Principle government transmission of hereditary factors from parent to off springs and population. Quantitative inheritance. Variation in gene structure. Sex determination. Introduction population genetics.

**CHM 201: Physical Chemistry - 2 Units**

Maxwell distribution law of molecular velocities. Equations of Boyle's law; Charles' law, Van der Waals equation. Calusius equation etc. Mean free path, transport properties of gases viscosity, diffusion effusion, thermal conductivity, reaction rates, rate laws, calculation of molecular diameters from viscosity and diffusion data. The principles of equipartition of energy. Effect of temperature on reaction rates, the Arhenius equation. The laws of the modynamics, entropy and free energy, reaction and phase equilibria. Introduction to photochemical reactions.

*Pre-requisite CHM 101, CHM 111, 30h (I).*

**CHM 202: Inorganic Chemistry I - 2 Units**

Chemistry of first transition metals, basic coordinator chemistry including elementary treatment of crystal field theory, comparative chemistry of the following elements.

- (a) Ga, In Ti (b) Ge. Sn Pb, (c) AS, Sb, Bi (d) Sc, Tc, Po, Elementary introduction of organometallic chemistry, significance of metal in biochemical systems.
- (b) Pre-requisite CHM 111 30h (T).

**CHM 203: Organic Chemistry I – 2 Units**

Factors affecting structure and physical properties of organic compounds, factors affecting directional movement of electrons in organic reactions, energy of activation, entropy of activation, transition theory and enthalpy diagrams, free radical substitution reactions in alkanols, functional group chemistry, electrophilic and nucleophilic organic reactions, addition,

elimination, substitution (displacement), oxidation, reduction, rearrangement, stereochemistry.

*Pre-requisite CHM III 30h (T).*

### **CHM 211: Analytical Chemistry I – 2 Units**

Theory of errors, accuracy, precision, mean deviation, standard deviation, statistical methods in analysis, theory of sampling, concept of precipitate formation contaminations, quality of good analytical precipitate calculation in gravimetry, titrimetry, acid-base, redox, precipitation titration, complexometric titration. Indicators for acid-base titration, complexometric titration, redox titration etc. chemical methods analysis, methods of analysis, methods of separation.

*Pre-requisite CHM 101 and CHM 111 30h.*

### **CSC 200: Introduction to Computer Science – 3 Units**

History computers, functional components of computers, characteristics of a computer, problem solving, flow chart. Algorithms, computer programming, statements symbolic names, arrays, subscripts expressions and control statements. Data representation: Binary, Octal and hexadecimal Arithmetic, compliments. Introduction to BASIC or FORTAN programming language, computer applications/system software.

### **CSC 202: Computer Programming I (Concept of Object Oriented Programming) 3 Units**

Introduction to object oriented programming concepts (e.g. Paradigm, OOP Language Features); generic programming: Classes/Objects, Encapsulation, Messages and Methods, Inheritance, Polymorphisms, Basic data structures, Graphical User Interface (GUI); Exception handling, Utilities and Packages. Using object oriented programming language such as Visual Basic, C++/C#.

### **MCB 211: General Microbiology 1- 3 Units**

History and development of Microbiology. Introduction to fundamental theories. General characteristics of microorganisms. Structure and comparison of prokaryotic and eukaryotic cells. Principles and methods of

general microbiology; viz: cultures, staining, microscopy and sterilization of media and equipment. Brief survey of microbes as friends and foes (roles of microbes in infection, food industry; and in the environment). Safety in microbiology laboratory.

### **MTH 214: Computer Programming I – 3 Units**

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmings, using techniques of good programming language style, computer organizations, programming language and programming. Algorithm development. A widely used programming language (such as Fortran, Pascal, CorCobol) should be used in teaching the above.

### **BCH 301: Metabolism I: Carbohydrates and Lipids - 4 Units**

Biochemistry of digestion and absorption of carbohydrates. Details of reaction of glycolytic and pentose phosphate pathways. Entry of glycogen, starch, fructose, galactose and other hexoses into the glycolytic pathways. Control of glycolysis. The tricarboxylic acid cycle and its control. Glycogenolysis, glycogenesis and gluconeogenesis and their control. The glyoxylate cycle. formation of glucose by the calvin pathway and the C<sub>4</sub> of the Hatch-Slack pathway. Biochemistry of digestion, absorption and transportation of fats. Lipids micelles monolayers and bilayers, lipo-protein systems. Fatty acids and triglyceride oxidation including odd-carbon fatty acids. Ketone bodies and their oxidation. Fatty acids and tricarboxylic acid metabolism in the tricarboxylic acid cycle. Detailed treatment of the pyruvate and alphaketoglutarate dehydrogenase complexes and their regulations. Disorders of lipid metabolism; Hormonal control of lipids metabolism; Engineering lipids metabolism for biodiesel production; Advances in lipids metabolism research (focus on preventive & therapeutic strategies for obesity and related disorders).

*Pre-requisite: BCH 201.*

### **BCH 302: Metabolism II: Amino Acids, Proteins and Nucleic Acids - 3Units**

Protein isolation, fractionation, purification and characterization. Uptake of amino acids by cells. Detailed study of amino acid transport including the glutamyl cycle. Nitrogen turnover in cells. Metabolism with emphasis on the biochemical importance of transaminase, glutamate dehydrogenases and glutamate synthetase. Degradation of amino acids. The urea cycle. Biosynthesis of amino acids. Inborn errors of metabolism associated with degradation of aromatic amino acids. Genome organization and biosynthesis of protein. Biosynthesis of proteins, nucleosides, nucleotides, nucleic acids and their regulations. Abnormalities in nucleic acid metabolism-exoderma pigmentation and skin cancer.

*Pre-requisite: BCH 201.*

### **BCH 303: General Biochemical Methods - 2 Units (Practical)**

Fractionation of cells and spectrophotometric estimation of purines and pyrimidines. Enzyme reactions and practical demonstration of the kinetics of enzyme catalyzed reactions. Students should comply with conventional methods of reporting practicals.

### **BCH 304: Enzymology - 3 Units**

Structures and functions of vitamins and coenzymes. Classification and nomenclature of enzymes. Enzymes as proteins. Isolation, purification and characterization of enzymes from animal and plant tissues. Enzyme specificity, active sites, inhibition and activation. Concept of cooperativity, Enzyme kinetics. Simplified treatment of 15 single substrate-enzyme catalyzed reactions. Isoenzymes, zymogen activation. Recent advances in enzymology.

*Pre-requisite: BCH 201*

**BCH 305: Membrane Biochemistry and Bioenergetics - 2 Units**

Structures, biochemical composition and functions of biological membranes. Isolation, characterization and classification of membranes. Molecular organization of membrane components. Natural and artificial membrane bilayers - the unit membrane hypothesis. Membrane transport system. Active versus passive transport systems. Transport of sugars and amino acids. Ionophores. High energy compounds. Energy changes and its importance. Chemical potentials, electrochemical potentials, electron transport, regulation of ATP production. Chemical thermodynamics. Oxidation and reduction reactions.

*Pre-requisite: BCH 211.*

**BCH 306: Biochemical Reaction Mechanisms - 2 Units**

This course will consider novel biochemical reactions and the mechanisms of catalysis. Current studies on the evaluation of active sites of important enzymes will be treated.

**BCH 310: Students Industrial Work Experience - 12 Units**

Each student will undergo industrial work training for six months at any biochemical related industry or research establishment. This training occurs in the second semester of the 3rd year.

**BCH 311: SIWES Report and Presentation- 3 Units**

Students are expected to write a report of their work experience at the industries, research institutes or laboratories where they were trained. The written reports are submitted at the beginning of the first semester of their final year. The students are also to present a short seminar on their SIWES programme in the department upon return from their industrial training.

**CHM 303: Organic Chemistry II – 3 Units**

Alcohols, nomenclature, preparation reactions, ethers and epoxides, esters, carboxylic acids, nomenclature, preparation, derivatives. Aldehydes and ketones, nomenclature, preparation, reactions, carbonions, nomenclature, preparation, chemical properties, classification of organic compounds

aromatic and alicyclic chemistry, poly-functional compounds, hetero-cyclic chemistry.

*Pre-requisite CHM 203, 45h (T).*

### **CHM 312: Instrumental Methods of Analysis – 3 Units**

Spectroscopic techniques, ultraviolet and visible methods. Quantitative analysis, infrared spectro-photometry, Raman spectroscopy, Quantitative analysis. X-ray methods, fluorescence methods, nuclear magnetic resonance and electron spin resonance spectroscopy, refractometry and interferometry polarimetry, calorimetry. 45h (T).

### **MCB 301: General Bacteriology - 3 Units**

Detailed study of bacteria, the cultural, morphological structural and biochemical characteristics of bacteria. Bacteria systematic and taxonomy. Identification scheme for bacteria. Bacterial cultures, growth and nutrition in bacteria Importance of bacteria in agriculture, medicine and industry, Concepts of the normal flora. Host-parasite relationships. Characterization tests for systematic bacteriology. Etiology, epidemiology pathogenic mechanism, clinical symptoms, laboratory diagnosis, prophylactic and therapeutic procedures, control and prevention of selected disease-causing bacteria including *Staphylococcus*, *Streptococcus*, *Corynebacterium*, *Bacillus*, *Lactobacillus*, *Actinomyces* and *Mycobacterium*.

*Pre-requisite, MCB 211.*

### **MCB 311: Food Microbiology I - 3 Units**

Introduction to food microbiology. Ecology of food-borne microorganisms. Characteristics and activities of bacteria, yeasts and moulds associated with foods. Intrinsic and extrinsic parameters of foods that affect microbial growth. The role of microorganisms in food processing. The microbiology of local food stuffs-garri, ugba, iru, ogiri, lafun, etc. sampling and enumeration of microorganisms in foods. Principles of food preservation (use of high and low temperatures, radiation, pressure, food additives and drying). Food infection and food intoxication.

### **BCH 401: Advanced Enzymology and Metabolic Regulations- 3 Units**

Steady state enzyme kinetics: mechanism of binding, binding equations and scatchard plot. Transient kinetic methods. Regulatory enzymes. Molecular models for allosterism: Hill model and Monod Wyman and Changeuz model. Positive and Negative cooperativity in terms of the various models. Multi-enzyme complexes. Criteria for determining purity of enzymes and enzyme reconstruction. Regulation of enzyme activity and synthesis. Nature of metabolic reaction sequences. Integration of metabolic pathways, turn over rates and metabolic pools. Experimental approaches to metabolic control. Identification of regulatory enzymes. Regulation of enzymes of metabolic pathways: feedback inhibition versus enzyme synthesis. Catabolite repression and product repression, the lactose operon. Identification of different regulatory mechanisms in the regulation of lipid, carbohydrate and protein metabolism in the muscles and liver should be emphasized.

*Pre-requisite: BCH 301.*

### **BCH 402: Tissue Biochemistry & Bioinorganic Chemistry - 2 Units**

Biochemistry of the liver; structure, glucose metabolism, nitrogen metabolism and detoxification reaction. Kidney; structure, electrolyte balance. nitrogen excretion and nutrient re-absorption and mechanism of tubular transport. Muscles: structure, contraction and its energetics, Transport mechanism for calcium and other ions. Adipose tissues; structure and lipid storage and metabolism. Biochemistry of reproductive tissues. Brain and neurochemistry. Mechanism of neurotransmission.

### **BCH 403: Advanced Biochemical Methods - 2 Units**

Exposure of students to methods of research, assimilation and dissemination of information. Latest equipment: operation and function. Use of library, preparation of dissertations or thesis, paper for publication and journal reviews. Students will go round all lecture halls, rooms and laboratories housing specialized equipment. Special assignments will be given to students.

### **BCH 404: Plant Biochemistry - 3 Units**

Organisation of plant cells. Photosynthesis, alkaloid and flavonoids, and plant hormones. Biosynthesis of carotenoid pigments. Biochemistry of plant development, dormancy, germination and ripening. The plant cell walls; characteristics, functions, chemical composition and biosynthesis. Lignin formation. Free, common and unusual amino acids. Pyrimidines, purines, nucleosides in plants. Functions and metabolism of auxins, gibberellins and cytokines. Synthetic growth regulators and herbicides: structure, function and relationship to plant hormones.

### **BCH 405: Industrial Biochemistry - 2 Units**

A short review of microbial physiology and genetics. A review of general metabolic pathways, control and application in industrial processes. Continuous culture methods: principles and applications. The use of fermentation for the production of alcohol, amino acids, antibiotics and other secondary metabolites. The use of immobilized enzymes or cells for the production of the above compounds. Process evaluation and development, over production of metabolites, amino acids, taste and flavour enhancers, vitamins, toxins, etc. Methods of screening and selecting micro-organisms of industrial importance.

Induction of mutation in micro-organisms and plant for the purpose of over production. Strain selection/development and enhancement. General cloning and application in industrial processes.

### **BCH 406: Molecular Biology - 4 Units**

Structures and properties of nucleotides and nucleic acids (brief review). Hydrolysis of nucleic acids. Elucidation of DNA structure. Unique and repetitive DNA sequences. Aspects of phage and bacteria genetics, prokaryotic and eukaryotic DNA polymerases and ligases. Genetic code and codons. Transportation of DNA. Biosynthesis, structures and functions of rRNA, tRNA and mRNA in translation reactions. Concept of mutagenesis. An introduction to cloning techniques.

*Pre-requisite: BCH 211 / BCH 305.*



### **BCH 407: Forensic Biochemistry - 2 Units**

Introduction to forensic science. Definition of terms. Scene of crime officers. Identification, collection and storage of exhibits. Analysis of samples of forensic interest. Case studies/applications in the following: rape, disputed paternity, anonymous documents, forged documents, trafficking in prohibited goods (e.g. cocaine, hemp etc.), Theft.

### **BCH 408: Environmental Biochemistry - 2 Units**

Toxic wastes and the environment. Types and characteristics of pollution-air, land and water. Pollutants, toxicants, toxins, heavy-metal contamination, pesticides, xenobiotics & chemicals. Aquatic toxicology, bio-accumulation & biotransformation. Aspects of biochemistry of bioremediation. Hazardous wastes and their effects. Waste management strategies and disposal techniques. Aspect of occupational hazards.

### **BCH 410: Project - 6 Units**

Students will be required to carry out literature review, perform experiments and produce short reports on selected areas/topics of interest to the academic staff. The students should comply with conventional methods of reporting projects. All project reports should be submitted as directed and oral examinations on the projects undertaken will be carried out by an external examiner preferably at the end of the second semester.

### **BCH 411: Food and Nutritional Biochemistry - 2 Units**

An introduction to the theory and application of physical and chemical methods of determining the constituents of food. Rancidity and auto-oxidation. Anti-oxidants, plant pigments, acids and pectic substances. Gelatinization, enzymic and non-enzymic browning. Nutrient-Nutrient interaction during heat processing. Principles of food storage and preservation of traditional foods-roots and stem tubers, fruits and fruit drinks, seeds and grains, leafy vegetables. Food poisoning intoxications, prevention and cure. Nutritive value of foods-fats, moisture, carbohydrates, proteins, vitamins and mineral elements. Energy values of food and energy

expenditure by mammals. Nutrient requirements by man, infants, pregnant women, adolescents and adults (recommended dietary allowances). Nutritional disorders, prevention and therapy-concepts of under nutrition and over nutrition and their associated diseases. The Biochemistry of starvation with emphasis on glycogenolysis and gluconeogenesis. Nutrients in metabolic reactions. Students in small groups are expected to visit food industries.

*Pre-requisites: BCH 201 and BCH 211*

### **BCH 412: Biochemical Reasoning & Biosynthesis of Macromolecules - 3 Units**

Evaluation and design of experimental biochemistry from literature. Analysis, interpretation and inference drawing from biochemical research data. Numerical problems in biochemistry. The need for the synthesis of macromolecules in living systems and required materials for their synthesis. Biosynthesis of (a) Polysaccharides starch, cellulose and glycogen; Glycoprotein/mucopolysaccharides, (b) Proteins and hormones, (c) Lipids, triacylglycerols, terpenes (rubber, carotenoids, cholesterol, steroid hormones), prostaglandins, (d) Nucleic acids. Regulation of biosynthesis of these molecules.

### **BCH 413: Pharmaceutical Biochemistry - 2 Units**

Biochemical aspects of host-parasite relationships, cellular metabolism in infected cells, metabolic factors affecting chemotherapeutic agents. Absorption, distribution and termination of drug action. Individual variability to drug response. The physiological and biochemical actions of selected drugs, opium and other addictive drugs, antibiotics, anti-malaria, etc. Nigerian traditional medicinal plants in the management and therapy of common ailments e.g. malaria, sickle cell anaemia, common cold, hepatitis etc. development and evaluation of new drugs. DNA vaccines.

### **BCH 414: Genetic Engineering & Biotechnology - 2 Units**

Replication, transcription and translation (a brief review). The genetic code and its relationship to cellular function. DNA replication in a cell-free system. Genetic transformation, trans- function and conjugation. Gene-transfer, gene mapping, structure of encaryotic genome. Recombinant DNA and its application. Iiybridomes. Introductory Biotechnology: definition and scope. Biotechnological techniques: isolation and sequencing of gene, gene cloning, PCR, southern and northern blotting etc. Applications: bioreactors, biosensors, microbial enhanced oil recovery, ore and metal mining, bioremediation of contaminated environments, genetically modified foods. Relationship between the economy, biotechnology and the society. Legal aspects of biotechnology.

*Pre-requisite: BCH 316.*

### **BCH 415: Seminar in Biochemistry - 2 Units**

Seminars on special topics in general biochemistry. Nutrition and food biochemistry and other topics such as hormones, immunobio-chemistry, oncology, brain biochemistry, monoclonal antibodies. These will be presented by the students to academic staff with other students in attendance.

### **BCH 416: Clinical Biochemistry - 3 Units**

The biochemical basis of laboratory test of clinical significance: routine tests of urine, blood, renal function, electrolyte balance, liver function, endocrine function, haemoglobin opathies, coagulation defects. Enzymes in diagnosis, Pregnancy tests and trace clement in nutrition. Clinical assessment of nutritional status. Students in small groups arc expected to visit hospital laboratories.

### **CHM 434: Industrial Management - 3 Units**

Industrial group and organizational behaviour, motivation, industrial law. Legislation in wages. Trademarks and patents, an introduction to the concepts and procedures of decision making in the management of business organization.