OBAFEMI AWOLOWO UNIVERSITY

ILE-IFE, NIGERIA

# DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

FACULTY OF SCIENCE

2017 - 2020

STUDENT HANDBOOK

## TABLE OF CONTENTS

## 1.0 INTRODUCTION

## 1.1 MEMBERS OF STAFF OF THE DEPARTMENT

## (A) ACADEMIC STAFF

| S/N | Name | Qualification | Status | Area(s) of Specialization |
|---|---|---|---|---|
| 1. | OYEDAPO Oluokun Oluboade | B. Sc., M.Sc., Ph.D. (Ife) | Professor | Molecular Biology, Phytochemistry/Medicinal Plant Research |
| 2. | AGBOOLA Femi Kayode | B. Sc., M.Sc., Ph.D. (Ife) | Professor | Enzymology/Protein Science |
| 3. | KUKU Adenike (Mrs) | B. Sc., M.Sc., Ph.D. (Ife) | Professor | Protein Science/Natural Product/ Lectinology |
| 4. | OBUOTOR Efere Martins | B. Sc., M.Sc., Ph.D. (Ife) | Reader | Neurochemistry/ Biochemical Toxicology |
| 5. | ADEWALE Isaac Olusanjo | B. Sc., M.Sc., Ph.D. (Ife) | Reader | Enzymology/Protein Science/Molecular Toxicology |
| 6. | BABALOLA Olubunmi Olusegun | B. Sc.(Ife), M.Sc., Ph.D. (Ibadan) | Reader | Environmental/ Molecular Toxicology |
| 7. | OSONIYI Omolaja | B. Sc.(Lagos), M.Sc., Ph.D.(Ife) | Senior Lecturer | Lipids and Membranes/Medicinal Plant Research |
| 8. | AKINPELU Bolajoko Ayinke (Mrs) | B. Sc., M.Sc., Ph.D. (Ife) | Senior Lecturer | Natural Product Research/ Biochemical Toxicology |
| 9. | OKONJI Rapheal Emuebie | B. Sc.(Calabar) M.Sc., Ph.D.(Ife) | Senior Lecturer | Enzymology /Protein Science |
| 10. | ODEKANYIN Oludele Olayemi | B. Sc., M.Sc., Ph.D. (Ife). | Lecturer I | Protein Science, Lectinology & Enzymology |
| 11. | AKINWUNMI Kemi Feyisayo (Mrs) | B. Sc.(Zaria), M.Sc., Ph.D (Ife) | Lecturer I | Medicinal Plant Research |
| 12. | OGUNRUKU Omodesola Oluwafisayo | B. Tech., M. Tech. Ph.D (Akure) | Lecturer I | Neurochemistry/Natural Product Research |
| 13 | AYINLA Zainab Adenike | B.Sc. (Ojo), M.Sc. (Salford) | Assistant Lecturer | Cancer Research/ Enzymology |
| 14 | OLAWUNI Julius Idowu | B.Sc., M.Sc., (Ife) | Assistant Lecturer | Neurochemistry/ Natural Product Research |

## (B) TECHNICAL STAFF

| S/N | Names | Qualifications | Status |
|---|---|---|---|
| 1. | KOMOLAFE<br>Serifat Abimbola (Mrs.) | G. C. E. O/L (1982) | Laboratory Supervisor |
| 2 | NOFIU<br>Alaba Oluwasegun | S.S.C.E (1996), SSCE (2000)<br>Cert. Computer Trainning (2004) | Laboratory Assistant |
| 3 | OMIREFA<br>Peace Ogochukwu (Mrs) | SSCE (2009) | Laboratory Assistant |

## (C) ADMINISTRATIVE STAFF

| S/N | Names | Qualifications | Status |
|---|---|---|---|
| 1. | OLUPONNA<br>Jelifat Folorunso (Mrs.) | H.N.D. (Secretarial Studies) (2002)<br>Certificate in ICT (2003) | Senior Confidential Secretary |
| 2. | IKWOGO<br>Mary Charity (Mrs) | Commercial IV Leaving Certificate<br>Pitman Advance Level (50 WPM) E.D.P. (2002) | Chief Secretarial Assistant |
| 3. | LAWAL<br>Adebola | GCE (2004)<br>NABTEB (2016) | Senior Office Assistant |

## 1.2 HISTORICAL NOTES.

### 1.2.1 History of the University

Obafemi Awolowo University, Ile-Ife is one of the three Universities established in Nigeria between 1961 and 1962 as a result of the report submitted to the Federal Government in September, 1960, by a Commission it appointed in April 1959 under the Chairmanship of Sir Eric Ashby, Master of Clare College, Cambridge, to survey the needs of post-secondary and higher education in Nigeria over the next twenty years.

The Government of Western Nigeria first announced in 1960 its intention to establish as soon as possible a University in western Nigeria which would be of the highest standard. Its policy would be to open its doors to students from all parts of the Federation and of the World.

The planning of the Obafemi Awolowo University was entrusted to two Committees. The one, a University Planning Committee comprising persons qualified to advice on the planning of a new University, and who in effect undertook the preparatory work connected with the establishment of the University pending the setting up of the Provisional Council of the University. The other, a University Parliamentary Committee, which would be advisory to the Minister of Education. On 8th June, 1961 the Law providing for the establishment of the Provisional Council of the University was formally inaugurated under the Chairmanship of Chief Rotimi Williams.

On 11th June, 1970, an Edict known as the University of Ife Edict, 1970 was promulgated by the Government of the Western State to replace the Provisional Council Law of 8th June, 1961. This Edict has since been amended by the Obafemi Awolowo University, Ile-Ife (Amended) Edict No. 11 of 1975 (Transitional Provisions) Decree No. 23 of 1975. This new Decree effected a takeover of the Obafemi Awolowo University by the Federal Military Government and established a Provisional Council as an interim governing body of the University which shall subject to the general direction of the Head of the Federal Government, control the policies and finances of the University and manage its affairs. This Provisional Council has since been replaced by a Governing Council.

The site selected for the University was at Ile-Ife, a town about 80 kilometers northeast of Ibadan in the Oyo State. Ife is famous as the Centre of the ancient civilization and home to a Museum which contains the renowned Ife heads. It was intended that temporary buildings should be put on the site to enable teaching to commence in October 1962 while the permanent buildings were being planned and erected. But when the Federal Government transferred the Ibadan Branch of the Nigeria College of Arts, Science and Technology to the University, it was decided that it would be unnecessary to put up temporary buildings at Ife and the University was temporarily located on the site of Ibadan Branch of the Nigeria College.

Teaching began in October 1962 with an initial enrolment of 244 students. The teaching, administrative and technical staff, either transferred from the Nigerian College or newly recruited from abroad numbered about eighty.

The University started with five Faculties – Agriculture, Arts, Economics and Social Studies (now Social Sciences), Law and Science. Six new Faculties have since been added, namely the Faculty of Education (established on 1st October, 1967), the Faculty of Pharmacy (established on 1st October, 1969), the Faculties of Technology and Health Sciences (now College of Health Sciences) (both established on 1st October, 1970), Faculty of Administration (which replaces the former Institute of Administration with effect from 1st October 1979) and Faculty of Environmental Design and Management (established on April 6, 1982).

In 1992, the University established a collegiate system with five Colleges. The system did not function effectively and was abandoned after two years. However, the Postgraduate College and the College of Health Sciences were retained. The College of Health Sciences now comprises of the Faculties of Basic Medical Sciences, Clinical Sciences and Dentistry.

The Adeyemi College of Education located in Ondo and the Institute of Agricultural Research and Training in Ibadan were initially integral part of the University. Although the Adeyemi College was separated from the University in 1975, however, there is still a close relationship between the two institutions. The College offers degree programme of the University under a system that is closely monitored by the University.

The Institute of Agricultural Research and Training, Ibadan with a branch at Akure in Ondo State, used to be fully superintended by the University until 1991. However, the Akure branch and the

College of Animal Science of the Institute continued to report to the Federal Government through the Director of the Institute. In terms of funding, the Institute of Agricultural Research and Training now relates to the Federal Ministry of Agriculture while the University still has administrative responsibility for the Research and Administrative staff of the Institution. The Director and the Secretary of the institute are responsible to the University through the Vice-Chancellor and Registrar respectively. The Vice-Chancellor is the chairman of the Institute's Governing Board.

The following other Institutes and major units exist in the University:

The Natural History Museum
The Institute of Ecology and Environmental Studies
The Centre for Gender and Social Policy Studies
The Centre for Industrial Research and Development
The Institute of Public Health
The Institute of Cultural Studies
The Technology Planning and Development Unit
The Computer Centre
The Drug research and Production Unit
The Equipment maintenance and Development Centre
The Central Technological Laboratory Workshop
The Central Science Laboratory
The Distance Learning Centre

Finally, some other agencies over which the University has no direct, or, in some cases limited control, have premises within the University and are listed below:
The Regional Centre for Training in Aerospace Surveys
The National Centre for Technology management
The Centre for Energy Research and Development
The African Regional Centre for Space Science and Education in English

The student population rose steadily from 244 in 1962/63 to about 22, 305 at the end of the 2014/2015.

### 1.2.2 Mission, Vision, Objectives of the University

**(a) MISSION**

To create a teaching and learning community for imparting appropriate skills and knowledge, behaviour and attitude; advance frontiers of knowledge that are relevant to national and global development; engender a sense of selfless public service; and promote and nurture the African culture and tradition.

**(b) VISION**

The vision is of a top rated University in Africa, ranked among the best in the world, whose products occupy leadership positions in the public and private sectors of the Nigerian and global economy, that has harnessed modern technology, social, economic and financial strategies, built strong partnerships and linkages within and outside Nigeria and whose research contributes a substantial proportion of innovations to the Nigerian economy.

**(c) STRATEGIC OBJECTIVES**

1. To produce graduates of international standard, with appropriate knowledge and skills in their field of study, who will be highly employable and able to employ themselves.

2. To provide high quality research and development activities that will promote the development of the Nation and enhance the image of the University and the researchers.

3. To harness modern technology especially ICT and modern social, economic and financial strategies to run a cost efficient and effective academic programme and institutional management.

4. To provide services that has relevance to and impact on the local community and the Nation.

5. To provide conditions of study, work and living in the University Community that is of appropriate standard.

6. To expand access to tertiary education in the face of unmet demand.

7. To operate as an equal opportunity educational institution, sensitive to the principle of gender equity and non-discriminatory on the basis of race, ethnicity, religion or physical disability.

**1.3 Members of the University**

The members of the University as defined on statute 2(1) are:

(a) the Officers of the University;
(b) the members of the Council;
(c) the members of the Senate;
(d) the members of the Academic Staff;
(e) the Graduates;
(f) the students; and such other persons as may by Statute be granted the status of members

A person shall remain a member of the University only as long as he is qualified for such membership under any of the sub-paragraphs (10) of this Statute.

## 1.4 The Officers of the University

The Officers of the University as contained in Statute 3 shall be:

(a) the Chancellor;
(b) the Pro-Chancellor;
(c) the Vice-Chancellor;
(d) the Deputy Vice-Chancellor (Academic);
(e) the Deputy Vice-Chancellor (Administration);
(f) the Registrar;
(g) the Librarian;
(h) the Bursar; and

such other persons as may by Statute be granted the status of officers

## 1.5 The Principal Officers of the University

| | | |
|---|---|---|
| Professor Eyitope OGUNBODEDE | - | Vice-Chancellor |
| Professor Adebayo Simeon BAMIRE | - | Deputy Vice-Chancellor (Academic) |
| Professor Chris Olugbenga AJILA | - | Deputy Vice-Chancellor (Administration) |
| Mr. Dotun AWOYEMI | - | Registrar |
| Dr. Femi Zaccheaus OGUNTUASE | - | University Librarian |
| Mrs. Josephine Aderonke AKEREDOLU | - | University Bursar |

## 1.6 Establishment of the University Council

(a) Functions

The University Council to be known as the Council of the Obafemi Awolowo University, Ile-Ife was established by an Edict. The Edict states that Council shall be the governing authority of the University and shall have the custody, control and disposition of all the property and finances of the University and, except as may otherwise be provided in the Edict and the Statutes, shall manage and superintend generally the affairs of the University and, in any matter concerning the University not provided for under this Edict, the Council may act in such manner as appears to it best calculated to promote the interests, objects and purposes of the University.

The Council, subject to the provisions of the Edict and Statutes has the following functions among others:

i. to determine, in consultation with Senate, all University fees;
ii. to establish, after considering the recommendation of the Senate on that behalf, Faculties, Institutes, Schools, Boards, Departments and other units of learning and research; to prescribe their organization, constitution and functions and to modify or revise the same;

iii. to authorize, after considering the recommendations of the Senate in that behalf, the establishments for the academic in the University, and with approval of the Senate, to suspend or abolish any academic post except a post created by this Edict or the Statutes;
iv. to authorize the establishments for the administrative staff and other staff in the University and to suspend or abolish any such posts other than posts created by the Edict or the Statutes;
v. to make the appointments authorized by this Edict and the Statutes;
vi. to exercise powers of removal from office and other disciplinary control over the academic staff, the administrative staff and all other staff in the University;
vii. to supervise and control the residence and discipline of students of the University and to make arrangements for their health and general welfare.

**(b) Composition of the Members of Council**

The Council as contained in Statute 10(1) as amended by Decree No. 11 of 1963 and Decree 25 of 1996 shall consist of the following members:

i. Ex-Officio Members: Pro-Chancellor
The Vice-Chancellor
The Deputy Vice-Chancellors
ii. 1 member from the Federal Ministry of Education
iii. 4 members appointed by National Council of Ministers
iv. 4 members of Senate appointed by Senate
v. 2 members of the Congregation elected by the Congregation
vi. 1 member of Graduates Association elected by Graduates Association

The Senate shall prescribe which Departments and subjects of study shall form part or be the responsibility of each of the Faculties. The next level of organization is the Faculty where the teaching and other activities of the Departments are co-ordinated. Proposals generally come from Departments to the Faculty Board although they can also be initiated at the Faculty level in which Departments normally have an opportunity to consider them before the Faculty Board takes a decision. The membership of the Faculty Board is stipulated in Statute 13(3) thus:

a) The Vice-Chancellor
b) The Deputy Vice-Chancellors
c) The Dean of the Faculty
d) The Professors and Heads of Departments comprising the Faculty;
e) Such other full-time members of the academic staff of the Departments comprising the Faculty as the Senate may determine after considering the recommendation of the Faculty Board;
f) Such other Professors and other Heads of Departments, as the Senate may determine after considering the recommendation of the Faculty Board;
g) such other persons within or outside the University as the Senate may appoint after considering the recommendation of the Faculty Board.

The next level is that of Departments which consist of groups of teachers and sometimes Research Fellows in a single subject with a Head who is usually although not always a Professor generally appointed by the Vice-Chancellor.

The Department is the normal basic unit of academic organization. It is at this level that the organization of teaching and the use of research facilities are primarily worked out. Senate may however recommend the creation of Institutes for groups of specialized subjects or discipline that require interdisciplinary research efforts and thus, cut across Faculties in scope.

## 1.7 ORGANIZATION, ADMINISTRATION AND CONTROL

The Vice-Chancellor is the Chief Executive Officer of the University and five other Principal Officers of the University, namely: the Deputy Vice-Chancellor (2), the Registrar, the University Librarian and the Bursar report to him. The University Librarian is in charge of the University Library while the Bursar takes charge of the University finances. The Registrar is the Secretary to Council and the Chief Administrative Officer of the University and he assist the Vice-Chancellor in the day-to-day administration. He is also the Secretary to Senate and heads the Registry, comprising the Directorate of Academic Affairs, the Directorate of Council Affairs, Division of Corporate Services and the Director of Personal Affairs. The Planning, Budgeting, Monitoring/Management Information System Unit takes care of the academic planning, budgeting and monitoring needs of the University and is under the Vice-Chancellor's Office.

The University Central Administration also includes some Units providing common services. They are the Medical and Health Services, the Division of Maintenance Services, the Physical Planning and Development Unit and the Computer Centre, Heads of these units report to the Vice-Chancellor.

### 1.7.1 CONGREGATION

The congregation comprises all full-time members of the academic staff and every member of the administrative staff who holds a degree of any recognized University. It discusses and declares an opinion on any matter whatsoever relating to the well-being of the University. It has twelve elected members in Senate and two elected members in the University Council.

### 1.7.2 INFORMATION ON FACILITIES

**Hezekiah Oluwasanmi Library.**

**Plan of the University Library:**

The Library consists of the North and South wings, which are connected by walkways on two levels

**Membership:**

Membership of the Library is available, on completion of a registration card, to all students, members of the senior staff of the University and such other persons as may be determined by the Library Committee or the University Librarian on behalf of it.

Students are required to renew their registration at the beginning of each academic year. Library Cards and Borrower's Tickets are not transferable; books issued on them remain the responsibility of the person whose name appears on them.

A lost Library Card or Borrower's Ticket may be replaced on submission of written application.

**The Library Collection**

Hezekiah Oluwasanmi Library now contains over 380,000 volumes. It consists of two main areas:

(i) The Undergraduate Areas and
(ii) The Research Areas

1. **Serials Collection**

   The Serial Collection consists of current journals, the most current issues of which are shelved in the displayed section of the Serials Room

   **a.** Latest back files i.e. the latest 10 years of journals which are on open access to registered senior staff and postgraduate students; and

   **b.** Older back files i.e journals older than ten years on closed access to all categories of readers who must obtain and complete request forms at the serial hatch.

2. **Africana Special Collection**

   The Africana Special Collection is a collection of rare and other books of primary interest to people whose fields of interest are in Africana Studies. Staff publications and theses submitted for higher degrees of the University as well as of other Universities are also housed there. The collection is closed access.

3. **Documents Collection**

   The Documents Collection includes official publications of the Federal Government of Nigeria, the old regional governments, the present state governments and the Federal Capital Territory. It also includes publications of other African governments and international organizations.

4. **Reference Collection**

   Dictionaries, encyclopedia, handbooks, directories, atlas, University Calendars etc, are shelved in the reference Room. Bibliographies, indexes and abstracts are available in the Bibliography Room. Reference books do not ordinarily circulate.

   A newspaper clippings file (post- October, 1985) and a vertical file of reprints and other pamphlet type material is kept in the Reference Room.

5. **Reserve Collection**

(i) Day reserve collection

Multiple copies of textbooks, particularly some of those recommended for specific courses, are shelved in the Reserved Books Room on Floor 3 North Wing East.

(ii) Two Hour Reserve

Some other materials, periodical articles in particular, are placed on 2-hour reserve. These may be obtained on request (signature and seat number required) and retained for a period of two hours at a time, subject to renewal, provided other readers have not demanded the materials.

6. **Recent Accessions**

A selection of books added to the Library stock is normally displayed for several days before being put in the main collection. The books may not be borrowed while on display but may be reserved at the loan Desk.

## CATALOGUES

A library catalogue is a finding list of books and other materials available in the Library. The following catalogues can be found in the Catalogue Hall:

(i) The author/Title Catalogue
(ii) The Subject Catalogue
(iii) The Shelf List
(iv) The Serial Catalogue
(v) The Documents Catalogue

## HOW TO BORROW A BOOK

When you have found the book that you want to borrow, you will be required to sign your name and address on the book card provided in duplicate. You must surrender a borrower's Ticket for each book borrowed.

When you return a book, you must ensure that you receive your Borrower's Ticket back immediately.

## RESERVATION

A book can be reserved by filling a reservation slip; in which case, it will not be renewed for the present borrower when returned; and if it is already overdue, it will be recalled at once.

**INTER-LIBRARY LOAN**

If the book you require is not in stock, it is often possible to borrow it from another library. This service is dependent on goodwill and co-operation between libraries, and readers who benefit from it are required to observe the regulations applying to each loan.

**PHOTOCOPYING SERVICES**

Within the limitations imposed by copyright, the library is able to supply readers with photocopies of periodical articles and parts of books at moderate charges.

**PENALTIES FOR OVERDUE OR LOST BOOKS**

Penalties for overdue books will be imposed as follows:

(a) N5.00 per day for the first 30 days; thereafter all loan privileges will stop
(b) Books specially recalled by the University Librarian will attract a fine of N10.00 per day after the third day from the date of recall.
(c) Books lost or damaged will attract a fine five times the current cost of the Books
(d) No student will be allowed to attend the Graduation Ceremony or receive his/her certificate without a clearance certificate from the University Library to the effect that no book or fine is outstanding against him or her.

### 1.7.3 DIVISION OF STUDENT AFFAIRS

**1. Guidance and Counseling Unit:**

The Division of Student Affairs has Professional Counselors who are committed to helping students grow in self-understanding in the process of integrating their personal and academic experiences. The services are free to students and are confidential (i.e. not used as part of his/her other University records). The services include personal counseling, group counseling, study skills improvement, tests anxiety reduction, personal crisis intervention, psychological testing, career and occupational counseling and settlement of grievances between students. Where necessary, consultations are made with campus organizations, specialist and academic Department, to ensure that students' problems are resolved satisfactorily.

The Counselors can be contacted in Rooms 9 and 10, Division of Student Affairs between 10.00 am and 2.00 p.m. Monday to Friday

**2. Scholarship and Financial Assistance:**

The Division of Students' Affairs serve as a link between students and sponsoring authorities, both within and outside Nigeria. Students are advised to check the Notice Boards in their respective Faculties as well as those at the Division of Student Affairs Building for advertisements and other relevant information.

Liaison is also maintained between students and governments at various levels for scholarship and bursaries.

### 1.7.4. Roll of Honours for Students.

Senate at a special meeting held on Wednesday 1st November, 2006 decided that the roll of honours for students be instituted in the University to enhance discipline and good performance among students. All students are enjoined to strive to be on the Honours Rolls.

**The details are as follows:**

(i) The Honours Roll should be at three levels, namely:
  (a) Departmental;
  (b) Provosts/Deans; and
  (c) University/Vice-Chancellor's;

(ii) The beneficiaries must have a minimum cGPA of 4.0 for Departmental Honours in all Faculties except the Faculty of Pharmacy and College of Health Sciences where the candidates are expected to have a cumulative/ weighted average of 60% and 62% respectively;

(iii) The beneficiary must maintain this grade annually to continue to enjoy the award;

(iv) The recommendations must be processed along with Rain Semester examination results;

(v) The student must be of good conduct;

(vi) He/She must not have any outstanding or carry-over courses and must not be repeating the year;

(vii) No student on Leave of Absence shall enjoy the Annual Rolls of Honours award;

(viii) No student that has a disciplinary problem shall enjoy the award;

(ix) The award shall be based on the recommendation of the Departmental Board of Examiners and the Faculty Board of Examiners, while that pertaining to the Vice-Chancellor/University shall be processed through the Committee of Deans

(x) Names of beneficiaries shall be displayed as follows:
  Departmental Honours - Departmental Notice Board
  Provost/Deans Honours - Faculty Notice Board
  Vice-Chancellor/University Honours: Floor 'O' Secretariat Building

(xi) Each beneficiary shall be given a certificate

## 1.8 RELEVANT SECTIONS OF UNIVERSITY EXAMINATION REGULATIONS

### 1.8.1 Registration for University Examinations

(a) A candidate for a University examination must have registered for the courses in the prescribed format not later than the closing date prescribed for registration for such courses. Any candidate who fails to register for courses at the appropriate time as prescribed by Senate will not be allowed to take any examination in such courses. Any examination taken without course registration shall be null and void.

(b) Students who register for courses are committed to the number of unit registered for and are expected to take examination in such courses. If a student failed to take an examination he would be scored 'OF' for the number of units he had registered for.
(c) Any student who does not have any course or courses to offer in a particular semester should apply for leave of absence.
(d) A candidate who has less than 15 units in a particular semester to graduate should apply to his/her Faculty Board for permission to register for less than 15 units. Failure to do so constitutes a breach of regulation which may result in the non-processing of the candidate's results.
(e) A candidate, who cannot register for courses during the prescribed period for registration because of an illness, must ensure that medical report on his illness is forwarded by him or his parents/sponsors to reach the Dean of his Faculty not later than four weeks after the end of the normal registration period as scheduled in the University calendar. Such a medical report should be forwarded for authentication by the Director of Medical and Health services for it to be considered valid. Such a candidate should be exempted from the penalties of late registration. All applications should be routed through the Head of Department.
(f) Students must attend a minimum of 75% of course instructions including lectures, tutorials and practicals where required to qualify to sit for examination in any course.
(g) A candidate for a university examination in a particular degree programme should not be a regular candidate for another degree in this or any other university concurrently. Any candidate so discovered shall forfeit his/her studentship.

### 1.8.2 Absence from Examination

Candidates must present themselves at such University examinations for which they have registered. Candidates who fail to do so for reason other than illness or accident shall be bound by the following regulations:

(a) Any student who fails to register for courses during one semester without permission should be deemed to have scored "0F" in the minimum number of units required for full-time student (i.e. 15 units)
(b) Candidates who registered for courses, attended classes regularly, did all practical and tests but did not take required semester examinations should be given a continuous assessment grade in each of the affected courses and a grade of "0" in the examination which they should have taken, but which they did not take.
(c) Candidates who have less than 15 units to graduate but who fail to take the required examinations should be deemed to have scored "0F" in the outstanding courses only provided such candidates obtained permission to register for less than 15 units.
(d) Any candidate who on account of illness, is absent from a University examination may be permitted by the Senate on the recommendation from the appropriate Faculty Board, to present himself for such examination at the level available opportunity provided that:

(i) A full-time student in the University shall report any case of illness to the University Health Centre at all times.

(ii) When a student falls ill during examination he should first report to the Director, Medical and Health Services before attending any hospital outside the University. A report of sickness should be made to the registrar within a week and a medical certificate for validation of his illness within three weeks.

(iii) When a student falls ill before an examination he shall be under an obligation to send a medical report countersigned by the Director, Medical and Health Services within one week of such illness. Any time outside this period, shall be considered on its own merit.

(iv) The Director of Medical and Health Services should, within 48 hours, submit a medical report on a candidate who is ill during an examination and is taken to the Health Centre or referred by it to the hospital for treatment.

(v) The candidate applying for leave of absence on medical grounds must forward his application together with a medical report to the Dean of his Faculty through his Head of Department. The Medical report must be countersigned by the Director of Medical and Health services. All applications for Leave of Absence must be taken by the appropriate Faculty Board.

### 1.8.3 Examination Offences

(a) A candidate must not be allowed during an examination to communicate by word or otherwise with any other candidates nor shall he leave his place except with the consent of an invigilator. Should a candidate act in such a way as to disturb or inconvenience other candidates, he shall be warned and if he persists he may, at the discretion of the invigilator, be excluded from the examination room. Such an action by the invigilator must also be reported in writing through the Head of Department to the Vice-Chancellor within 24 hours.

(b) It shall be an examination offence for any student, staff or any person whatsoever to impersonate a candidate in any University examination. Any student or staff of the University found guilty under this regulation shall be subjected to disciplinary action by the appropriate authority of the University. The candidate impersonated shall also be liable of an infraction of this regulation where it is established directly from circumstantial evidence that the impersonation is with his knowledge or connivance.

(c) No candidate shall take into an examination room, or have in his possession during an examination any book or paper or printed or written documents whether relevant to the examination or not, unless specifically authorized to do so. An invigilator has authority to confiscate such documents.

(d) Mobile phones are not allowed in the examination halls

(e) A candidate shall not remove from an examination room any papers, used or unused. Except the question paper and such book and papers if any, as he is authorized to take into the examination room.

(f) Candidate shall comply with all "direction to candidates" set out on an examination answer book or other examination materials supplied to them. They shall also comply with direction given to them by an invigilator.

(g) Candidates shall not write on any paper other than the examination answer books. All rough work must be done in the answer books. All rough work must be done in the answer books and crossed out neatly. Supplementary answer books, even if they contain only rough work must be tied inside the main answer books.

(h) When leaving the examination room, even if temporarily, a candidate shall not leave his written work on the desk but he shall hand it over to an invigilator. Candidates are responsible for the proper return of their written work.

(i) Smoking shall not be permitted in examination room during examination sessions

(j) Any candidate or staff who attempts in any way to unlawfully have or give pre-knowledge of an examination question or to influence the marking of scripts or the award of marks by the University examiners shall be subjected to disciplinary action by the appropriate authority of the University.

(k) If any candidate is suspected of cheating, receiving assistance or assisting other candidates or infringing any other examination regulation, a written report of the circumstance shall be submitted to the Vice-Chancellor within 24 hours of the examination session. The candidates concerned shall be allowed to continue with examination.

(l) Any candidate suspected of examination malpractice shall be required to submit to the invigilator a written report immediately after the paper. Failure to make such report to the Vice-Chancellor shall be regarded as a breach of discipline.

(m) Where a Head of Department fails to forward a report on examination malpractice to the Vice-Chancellor such action would be considered a misconduct.

(n) Where the Vice-Chancellor is satisfied on the basis of the reports forwarded to him that any candidate has a case to answer, he shall refer the case to the Central Committee on Examination malpractice.

### 1.8.4 The Course Unit System and the Computation of Grade Point Average (CGPA)

**Pattern of Examination and Assessment under the Course Unit System**

**(a) Pattern of Examination**

(i) Each course shall be examined at the end of the course. The examination shall be conducted as prescribed by Senate.

(ii) Each examination shall be 1-3 hours in duration in addition there may be a practical paper and/or an oral examination.

(iii) There shall be continuous assessment of each course and this shall constitute a percentage of the final grade.

**(b) Measurement of Performance**

Performance in a course shall be measured in terms of:

(i) the results of prescribed theory and practical examination

(ii) continuous assessment which shall constitute 40% of measured performance

(iii) Assessment of such essay, practical exercises and reports prescribed for each course.

**(c) Level of Performance**

A candidate shall be recorded as having attained in a course a level of achievement grade as follows:

| | | | |
|---|---|---|---|
| A | = | Excellent | 70% - 100% |
| B | = | Very Good | 60% - 69% |
| C | = | Good | 50% - 59% |
| D | = | Satisfactory | 45% - 49% |
| E | = | Adequate | 40% - 44% |
| F | = | Failure | 0% - 39% |

### 1.8.5 DEFINITION OF TERMS

(i) **Student Workload:**

This is defined in terms of course units. One unit represents one hour of lecture or one hour of Tutorial or 2-4 hours of practical work per week throughout a semester. Thus for example, a course in which there are 2 hours of lectures and 1 hour of Tutorial per week is a 3 unit course

(i) **Total Number of Units (TNU):**

This is the total number of course units carried by a student in a particular semester. It is the summation of the load units on all courses carried during the semester. For example, a student who is carrying 6 courses of 3 unit each has a TNU of 18 for that semester. No student shall be allowed to carry (i.e. register for) or be examined in more than 24 units in any particular semester.

(ii) **Cumulative Number of Units (CNU):**

This is the total number of course units over all the semesters from the beginning to date. A student who is prone to repeating courses will finish (if he does drop out) with a higher CNU than his non-repeating colleague and will most likely require a longer time to complete requirements for the award of Degrees.

(iii) **Level of Performance Rating:**

This is the rating of grades obtained in terms of credit points per load unit. The rating used is as follows:

| **Level of Performance** | | | **Rating (credit points per uint)** |
|---|---|---|---|
| A | = | 70% - 100% | 5 |
| B | = | 60% - 69% | 4 |
| C | = | 50% - 59% | 3 |
| D | = | 45% - 49% | 2 |
| E | = | 40% - 44% | 1 |
| F | = | 0% - 39% | 0 |

Based on the above , a student who obtained a grade of 'A' in a 4 unit course has scored 20 credit points and one who obtained a grade of C in that course has scored 12 credit points.

(iv) **Total Credit Points (TCP):**

This is the sum of the products of the course units and rating in each course, for the entire semester period. For example, consider a student who took four courses of 5 units each. Let's say the grade obtained in the four courses were C. B. F. and D respectively. The TCP of this student is obtained as 5 x 3 + 5 x 4 + 5 x 0 + 5 x 2 = 45.

(v) **Cumulative Credit Point (CCP):**

This is the summation of Total Credit Points over all semesters from the beginning to date.

(vi) **Grade Point Average (GPA).**

This is the total credit points (TCP) divided by the total units (TNU). For example, consider the student's scores referred above. His TCP is 45 and of course, his TNU is 20 (i.e. 4 courses at 5 units each, for the semester). The highest GPA that can be earned is 5.0 and that is when a student has earned a grade of 'A' in every course during the semester. The lowest GPA obtainable is 0.0 and this would happen if the student has 'F' all round during the semester.

(vii) **Cumulative Grade Point Average (CGPA):**

This is the summation of TCPs for all semesters, divided by the summation of TNUs for the said semesters. Like the GPA, CGPA obtainable ranges from 0 to 5.

**GPA AND cGPA SAMPLE COMPUTATIONS**

**Sample Computations:**

Consider a student who has enrolled in a course programme designed as EES and has just completed 2 full semesters in the University. His course programme and his GPA and CGPA could be as follows:

**SEMESTER 1**

| | L | T | P | Units | Results | | |
|---|---|---|---|---|---|---|---|
| Course Code | | | | | Grades | Credit Points | GPA/CGPA |
| EES 101 | 1 | 0 | 0 | 1 | 78% (A) | 1x5 = 5 | GPA= 29/18 =1.61 |
| EES 103 | 3 | 0 | 2 | 4 | 60% (B) | 4x4 = 16 | CCP = 29+0 = 29 |
| EES 105 | 3 | 0 | 3 | 4 | 45% (D) | 4x2 = 8 | CNU = 18+0 = 18 |
| EES 107 | 3 | 1 | 5 | 6 | 38% (F) | 6x0 = 0 | CGPA =29/18 = 1.61 |
| EES 109 | 2 | 0 | 0 | 3 | 27% (F) | 3x0 = 0 | |
| | | | | 18 (TNU) | | 29 (TCP) | In this case the TCP, TNU and GPA will be the same for CCP, CNU and CGPA |

**SEMESTER II**

| | L | T | P | Units | Results | | |
|---|---|---|---|---|---|---|---|
| Course Code | | | | | Grades | Credit Points | GPA/CGPA |
| EES 102 | 2 | 0 | 0 | 2 | 66% (B) | 2x4 = 8 | GPA = 52/18 = 2.89 |
| EES 104 | 3 | 0 | 2 | 4 | 72%(A) | 4x5 = 20 | CCP = 52+29 = 81 |
| EES 106 | 3 | 0 | 3 | 4 | 47%(D) | 4x2 = 8 | CNU = 18+18 = 36 |
| EES 108 | 3 | 1 | 0 | 4 | 53% (C) | 4x3 =12 | CGPA = 81/36 = 2.25 |
| EES 110 | 2 | 1 | 3 | 4 | 42% (E) | 4x1 = 4 | |
| | | | | 21 (TNU) | | 51(TCP) | |

### 1.8.6 ASSESSMENT AND AWARD OF DEGREES

(i) A student's workload is defined in terms of course units. One unit represents one hour of lecture or one hour of tutorial, or 2-4 hours of practical work per week throughout a semester or a full session of two semesters.

(ii) The final award and the class of the degree shall be based on the cumulative grade point average (CGPA) obtained by each candidate in all prescribed courses approved by the university. The final cumulative grade point average shall be calculated on the basis of the total number of credit points and the total number of course units registered for during the course of the student's programme. In the case of failed course, the candidate must repeat the course at the next available opportunity. If the course is an elective, the candidate may substitute another course and shall not be required to pass the failed elective course. If the course is a restricted elective, substitution can only be made from the list of restricted electives. The failed grade would however be reflected in the transcript.

(iii) A candidate who has satisfactorily completed all requirements for the degree with an overall grade point average of not less than 1.00 shall be awarded the honours degree as indicated below;

| | |
|---|---|
| First Class | 4.50 – 5.00 |
| Second Class (Upper Division) | 3.50 – 4.49 |
| Second Class (Lower Division) | 2.40 – 3.49 |
| Third Class Honours | 1.50 – 2.39 |
| Pass | 1.00 – 1.49 |

(iv) Passes in 12 units of Special Electives is a requirement for graduation.

(v) A candidate who scores a cumulative grade point average (CGPA) of less than 1.00 in two consecutive semesters shall be required to withdraw from the university.

### 1.8.7 TRANSFER WITHIN THE UNIVERSITY AND LENGTH OF STAY IN THE UNIVERSITY

(a) To qualify for a degree, a candidate will normally be required to spend a minimum of 4-5 academic years at the Obafemi Awolowo University.

(b) If a student transfers from one faculty to another, the transfer would be treated as if he/she is just being admitted into the University since as part of the requirement for graduation the student has to take all the foundation/compulsory courses in the new Faculty/Department. In that case, his/her stay in the new Faculty/Department should be 1½ times the number of semesters required to complete a programme.

(c) Where a student transfers from a science based Faculty to another, the computation of his result in the new Faculty shall take cognizance of his previous CGPA in the new Department. The duration of stay in the University will be what remains of the 1½ times the number of semesters required to complete the programme as approved by Senate.

(d) Where a student is transferring from a science-based to Humanities/Arts- based Faculty or vice-versa, the transfer should be treated as if the student is just being admitted into the university. The GPA of the student will not be transferred to the new Department. He/She will however be required to take all the foundation/compulsory courses in the new Department.

### 1.8.8 RELEASE OF EXAMINATION RESULTS

(i) At the end of each semester, provisional list of successful candidates in course examination shall be published by the Chief Examiner soon after the ratification of the recommendation of the board of Examiners by the Faculty Board.

(ii) The proceedings of Board of Examiners are confidential and are in no circumstances to be disclosed at any time to any candidate or to any other unauthorized person.

(iii) However, without prejudices to Regulation (ii) above, a student contesting a given grade after the release of results can appeal to the Vice-Chancellor, who shall cause the Head of Department to call for the affected paper of the candidate for remarking. This shall be done after payment of prescribed fee.

(iv) The final results of candidates for the award of a degree shall be published by the Registrar after they have been approved by Senate.

### 1.8.9 STUDENT REGISTRATION ON E-PORTAL

- Visit e-portal URL directly with www.eportal.oauife.ng

OR

Visit OAU website with www.oauife.edu.ng and click ‘e-portal’ from OAU

**Home Page.**

From e-portal home page

- Click 'Payment/Registration (on-line)

**From Login Screen**

- Read additional directives and comply
- Click on 'Submit' to display your identity for confirmation.
- Click 'OK'
- Click again 'Payment/Registration (on-line)' to display list of tables of students.

**From the Table List**

- Click on 'Bio-Data Form' to display 'Submit Information Form (MIS2)' and fill accordingly
- Click 'Submit' to save your form.

## 2.0 FACULTY OF SCIENCE

### 2.1 History of Faculty of Science

The Faculty of Science was one of the foundation Faculties established at the inception of the University of Ife in 1962. It was located at the Ibadan Campus up till January 1970 when it moved in its entity to its present facilities at Ile-Ife.

The student's population within the Faculty has grown rapidly from the initial intake of 80 in 1962 to 2,529 registered students at the end of 2015/2016 session.

Similarly, the range of programmes offered by the Faculty has increased considerably from the initial five- Physics, Chemistry, Mathematics Botany and Zoology in 1962. The Faculty now offers academic programmes leading to the B.Sc., M.Sc., M.Phil. and Ph.D degrees in eleven major disciplines / areas (Applied Geophysics, Botany, Biochemistry, Chemistry, Engineering Physics, Geology, Mathematics, Microbiology, Physics, Zoology, Statistics and Mathematics) within eight Departments namely: Biochemistry and Molecular Biology, Botany, Chemistry, Geology, Mathematics, Microbiology, Physics and Zoology.

Apart from the above, there are three vital services units: the Natural History Museum, the Technology Training Scheme and the Biological Gardens within the Faculty.

Apart from the Faculty academic programmes, it is completely responsible for teaching basic science courses to all new entrants to the Science-oriented Faculties and offers in addition, services courses to the Faculties of Agriculture, Education, Environmental Design and Management, Health Sciences, Pharmacy, Social Sciences and Technology.

The Faculty has at present over 228 academic staff.

## 2.2 Vision and Mission Statements of the Faculty of Science

### 2.2.1 VISION

The vision is of a top rated university in Africa, that is, the technological flagship of the West African sub-region, as evidenced by its application of modern technology to teaching, research and community service, and provision of practical solutions to social, cultural and economic problems.

### 2.2.2 MISSION

To promote by research and other means the advancement of knowledge and its practical application to social, cultural, economic, scientific and technological problems; to create a conducive teaching and learning community for impacting skills, knowledge, behavior and attitude; advance and protect the independence of the academic enterprise; engender a sense of selfless public service and promote the African culture and tradition.

# 3.0 DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY

## 3.1 Brief History of the Department

The Department of Biochemistry and Molecular Biology was known as Department of Biochemistry until 9th December, 2015 when the proposal for a change of name was approved by the University Governing Council at its 243th sitting. The re-naming became imperative, firstly, to accommodate the ever expanding fields of Biochemistry and Molecular Biology which together forms the bedrock of all the other Life Science disciplines. Secondly, is to keep in line with global trends in the discipline as recommended by the International Union of Biochemistry and Molecular Biology (IUBMB) and the Nigerian Society of Biochemistry and Molecular Biology (NSBMB). However, the history of the Department dated as far back as 1969 when the University decided, based on the report of a committee, to amalgamate the existing Department of Zoology and Botany into a giant Department called Biological Sciences, which would also include Biochemistry, Microbiology and Genetics. All the five programmes existed as units in the Department of Biological Sciences. Each unit graduated students in Biology with specialization in Biochemistry, Botany, e.t.c. (e.g. B.Sc. Biology with specialization in Biochemistry). At some point, Applied Biology was introduced as a specialization in Biological Sciences but was again removed after a few session.

The pioneering staff included Dr. F.D. Onajobi (now retired Professor F.D. Onajobi) appointed in November 1968 but joined in March 1969, Dr. A. Afolayan (now retired Professor A. Afolayan) appointed in October 1969, but joined in August 1970, Dr. O.A. Ogunbiyi (now late) joined in 1971 and Professor Z. Boszormenyi (now late) who transferred from the Department of Plant Science, Faculty of Agriculture, to Head the Biochemistry Unit in 1971. The first Biochemistry programme was prepared and contained all the necessary Chemistry, Mathematics, Physics, Zoology, Botany, Microbiology courses required by the students offering Biochemistry as a course.

The first set of eight students to graduate with B.Sc. (Hons) Biology, with specialization in Biochemistry from the Department of Biological Sciences graduated in June 1972. Also postgraduate programmes in Biochemistry (M.Sc., M.Phil. and Ph.D.) were developed and approved in 1974. The first set of Postgraduate students was admitted in the 1975/76 session. The academic staff of Biochemistry unit of the Department of Biological Sciences gradually grew in number and strength. Dr. Muhlrad, a Hungarian, joined the Department during 1971/72 session and was in the Department until 1973. Dr. J.O. Folayan (now late Prof. Ololade Folayan), joined the Department in 1973. Dr. (Miss) Theresa Ahern, (now Dr. (Mrs.) Animashaun), (Briton) joined the Department in May 1975. Dr. E.O. Ngaha joined the Biochemistry staff in 1975/76 session, Prof. Akintola Aboderin, transferred his services from the University of Lagos, Lagos to the Department. Dr. (Mrs.) W.L. Stafford, (Scottish), and a nutritional Biochemist was also with the Department for a few years before leaving in September 1977. Dr. W.F. Vann, a young Afro-American who was a Microbial Biochemist, spent one session, leaving in September 1977. Mr. M. D. Okusanya joined the Department as a Technologist in December 1974.

As a result of the deliberations and recommendation of various committees which spanned over a period of about five years, the amalgamation of Biochemistry, Botany, Microbiology, Zoology and Genetics into one Department of Biological Sciences came to an end on July 1, 1976, when Biochemistry became a separate Department. However, the other four units (Botany, Microbiology, Zoology and Genetics) still remained together under the Department of Biology for a few more years before each unit, except Genetics became Departments. The recommendation was that Genetics should support the various Departments and be taught in the Department of Botany and Zoology.

Since its inception as a full-fledged Department, the Curriculum of the Department has been revised many times with the last one in 2015 in line with NUC minimum standard as well as global trends. These revisions were necessary in line with the international growth and development in the science of Biochemistry and Molecular Biology.

Right from the inception of Biochemistry as a unit in Biological Sciences, the Department was entrusted with the task of teaching Biochemistry courses to various allied Departments and Faculties. These include Biochemistry for Faculties of Pharmacy and Health Sciences, Technology (Food Science and Technology), Departments of Botany, Zoology, and Microbiology. Over the years, the Department of Biochemistry at Obafemi Awolowo University, Ile-Ife has graduated many students and the Department is proud to say that the Alumni hold their heads high in various works of life they find themselves owing largely to the solid background they acquired from the Department and by extension the University.

## 3.2 Bachelor of Science Degree Programme in Biochemistry

### 3.2.1. Vision, Mission, Philosophy and Objectives of the Programme

**Vision**

To produce graduate in Biochemistry and Molecular Biology with a competitive edge on the global world stage who would contribute to innovations in medicine, pharmacy, agriculture and allied fields by research.

**Mission**

To create an enabling environment for our students congruent with modern technologies and global best practices for teaching and cutting edge research in Biochemistry and Molecular Biology.

**Philosophy of the Department:**

Biochemistry and Molecular Biology together form the bedrock of all other life science disciplines. These are dynamic fields and its more recent frontiers in proteomics, genomics, lipidomics, bioinformatics and biotechnology require physical and mathematical approaches in order to arrive at a full understanding of the biological phenomenal.

To this end, the Department of Biochemistry and Molecular Biology at the Obafemi Awolowo University, Ile-Ife creates a scholarly environment armed with a culture of sound teaching and cutting-edge research to produce graduates who are able to compete with their peers anywhere in the world, men and women with innovative minds proffering solutions to issues/questions of national and global importance in medicine, pharmacy, agriculture and allied fields..

**OBJECTIVE:**

To realize these ideals, the objectives of the Department are as follows:

(a) provide a good background in physical, biological and mathematical sciences for each student;
(b) provide a sound and all-round education in the basic science of Biochemistry up to the bachelor's degree level;
(c) make students aware of the relevance of Biochemistry in various ways and areas in meeting the manpower needs of the country;
(d) provide appropriate courses for students from Faculties-Science, Pharmacy, Education, Technology, Health Sciences, Agriculture, who require a working knowledge of Biochemistry; and
(e) provide specialized training in Biochemistry at higher degree levels.

### 3.2.2. Degree Offered

The Department of Biochemistry and Molecular Biology awards Bachelor of Science Degree in Biochemistry (B.Sc.(Hons) Biochemistry)

### 3.2.3. Entry Requirements

(a) **Unified Tertiary Matriculation Examination (UTME)**

Students intending to read for the B.Sc. degree in Biochemistry must have at least five credits in the Senior Secondary Certificate Examination (SSSCE) including English Language, Mathematics, Chemistry, Physics and Biology. For the UTME, candidates are required to answer questions in English Language, Chemistry, Mathematics, and either Biology or Physics.

(b) **Direct Entry (DE)**

Candidates, who, in addition to the five relevant credit passes at SSSCE or "O" Level, have passed satisfactorily at "A" Level in Chemistry, Physics and either Biology or Mathematics with a minimum of 5 points.

### 3.2.4 Requirements for the Award of Degree

The minimum requirement for the award of the B.Sc. degree in Biochemistry is satisfactory completion of a minimum of 162 units of course work, made up of:

| | | | |
|---|---|---|---|
| i. | General University Requirements | (Special Electives) | 12 |
| ii. | Faculty Requirements | | 50 |
| iii. | Departmental Requirements | | 96 |
| iv. | Restricted Electives | | 4-6 |
| | **Grand total** | | **162-164** |

### 3.2.5. Courses required for graduation

(i) Special Electives (University requirement)

| Course Code | Course Titles | Units |
|---|---|---|
| SER 001 | The Use of English (compulsory) | 4 |
| | Other Special Electives Chosen from Underlisted | 8 |
| SER 002 | The Humanities and the African Experience | 4 |
| SEA 001 | Government and Administration of Public Sector | 2 |
| SEA 002 | Elements of Business Administration | 2 |
| SEE 001 | Indigenous Education in Nigeria | 2 |
| SEE 002 | Education and the Social Organization, Customs and Cultures of Nigeria | 2 |
| SEL 001 | Introduction to Law | 2 |
| SEL 002 | Introduction to Legal Institution and Processes | 2 |

| | | |
|---|---|---|
| SEM 001 | Fundamentals of Building and Design for Human Habitation | 2 |
| SEM 002 | Issues in Land Management | 2 |
| SEO 001 | Fundamentals of Human Behaviour | 2 |
| SEO 002 | Man and His Environment | 2 |
| SEO 003 | Principles and Practice of Entrepreneurship and Self-employment | 2 |
| SEO 004 | Business Environment and Approaches to Business Start-up | 2 |
| | Sub Total | 12 |

**(ii) Faculty Requirements**

| Course Code | Course Titles | Units |
|---|---|---|
| CHM 101<br>CHM 103 | Introductory Chemistry I<br>Experimental Chemistry I | 4<br>1 |
| CHM 102<br>CHM 104 | Introductory Chemistry II<br>Experimental Chemistry II | 4<br>1 |
| BOT 101<br>BOT 103 | Introductory Botany I<br>Experimental Botany I | 3<br>1 |
| BOT 102<br>BOT 104 | Introductory Botany II<br>Experimental Botany II | 3<br>1 |
| MTH 101 | Elementary Mathematics I | 5 |
| MTH 102 | Elementary Mathematics II | 5 |
| PHY 105<br>PHY 107 | Physics for Biological Sciences I<br>Experimental Physics IA | 4<br>1 |
| PHY 106<br>PHY 108 | Physics for Biological Sciences II<br>Experimental Physics IB | 4<br>1 |
| ZOO101<br>ZOO 103 | Introductory Zoology I<br>Experimental Zoology I | 3<br>1 |
| ZOO 102<br>ZOO 104 | Introductory Zoology II<br>Experimental Zoology II | 3<br>1 |
| FSC 201<br>FSC 202 | Entrepreneurship for Science Student I<br>Entrepreneurship for Science Student II | 2<br>2 |
| | Sub-Total | 50 |

**(iii) Departmental Requirements**

| Course Code | Course Title | Units |
|---|---|---|
| BOT 202 | Biometry | 3 |
| BOT 203 | Introductory Genetics and Evolution | 4 |
| CHM 201 | Basic Inorganic Chemistry | 4 |
| CHM 202 | Basic Organic Chemistry | 4 |
| CHM 203 | Basic Physical Chemistry | 4 |
| CHM 205 | Experimental Physical/Inorganic Chemistry | 1 |

| | | |
|---|---|---|
| CHM 206 | Experimental Organic Chemistry | 1 |
| CHM 307 | Application of Spectroscopic Methods | 3 |
| CHM 309 | Experimental Physical Chemistry | 2 |
| CHM 312 | Experimental Organic Chemistry | 2 |
| CSC 201 | Computer Programming I | 3 |
| MCB 201 | General Microbiology I | 3 |
| MCB 202 | General Microbiology II | 3 |
| BCH 201 | Introduction to Cell and Molecular Biology I | 2 |
| BCH 203 | Chemistry of Macromolecules | 2 |
| BCH 204 | Introduction to Cell and Molecular Biology II | 2 |
| BCH 301 | General Biochemistry I | 3 |
| BCH 302 | General Biochemistry II | 3 |
| BCH 305 | Functional Biochemistry | 2 |
| BCH 306 | Nutritional Biochemistry | 2 |
| BCH 307 | Experimental Biochemistry I | 1 |
| BCH 308 | Experimental Biochemistry II | 1 |
| BCH 309 | Physical Biochemistry | 2 |
| BCH 310 | Protein Structure and Functions | 2 |
| BCH 312 | Student Industrial Work Experience | 3 |
| BCH 314 | Biochemistry of Plant Secondary Metabolites | 2 |
| BCH 316 | Fundamentals of Bioinformatics | 3 |
| BCH 401 | Enzymology | 3 |
| BCH 402 | Biochemistry of Immune System | 2 |
| BCH 403 | Lipids and Biomembranes | 3 |
| BCH 404 | Biochemical Toxicology | 2 |
| BCH 405 | Physicochemical Methods in Biochemistry and Molecular Biology | 2 |
| BCH 406 | Seminars and Scientific Communication in Biochemistry | 1 |
| BCH 407 | Nucleic Acid and Protein Synthesis | 2 |
| BCH 409 | Clinical and Forensic Biochemistry | 1 |
| BCH 411 | Laboratory Techniques in Biochemistry I | 2 |
| BCH 412 | Laboratory Techniques in Biochemistry II | 2 |
| BCH 413 | Research Project I | 3 |
| BCH 414 | Research Project II | 3 |
| MOB 401 | Principles of Molecular Biology | 2 |
| MOB 402 | Application of Biochemistry and Biotechnology | 2 |
| Subtotal | | 96 |

**(iv) Restricted electives**

| Course Code | Course Title | Units |
|---|---|---|
| BCH 408 | Microbial Physiology and Biochemistry | 2 |
| BCH 410 | Biophysics | 2 |
| CHM 314 | Alicyclic Bifunctional Aliphatic and Terpenoid Compounds | 2 |

| | | |
|---|---|---|
| ENB 302 | Environmental Technology and Biotechnology | 3 |
| FST 403 | Food Microbiology II-Fermentation of Food Products | 2 |
| MOB 407 | Process Biochemistry | 2 |
| PCG 301 | Drugs of Biological Origin I | 3 |
| PCG 308 | Separation Techniques in Pharmacy | 1 |
| MTH 202 | Mathematical Methods II | 4 |
| MTH 201 | Mathematical Methods 1 | 4 |
| CHM 304 | Thermodynamics | 3 |
| CHM 305 | Chemical Kinetics | 2 |
| Subtotal | | 4 |

**(v) Free Electives**

| Course Code | Course title | Units |
|---|---|---|
| | Free Electives | 4 |

**Grand Total 162**

## 3.2.6. OUTLINE OF COURSES BY PARTS AND SEMESTER

### PART I

| HARMATTAN SEMESTER | | | | | | RAIN SEMESTER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **L** | **T** | **P** | **U** | **Course Code** | **Course Title** | **L** | **T** | **P** | **U** |
| CHM 101 | Introductory Chemistry I | 3 | 1 | 0 | 4 | CHM 102 | Introductory Chemistry II | 3 | 1 | 0 | 4 |
| CHM 103 | Experimental Chemistry I | 0 | 0 | 3 | 1 | CHM 104 | Experimental Chemistry II | 0 | 0 | 3 | 1 |
| MTH 101 | Elementary Mathematics I | 4 | 1 | 0 | 5 | MTH 102 | Elementary Mathematics II | 4 | 1 | 0 | 5 |
| PHY 105 | Physics for Biological Sciences I | 3 | 1 | 0 | 4 | PHY 106 | Physics for Biological Sciences II | 3 | 1 | 0 | 4 |
| PHY 107 | Experimental Physics 1A | 0 | 0 | 4 | 1 | PHY 108 | Experimental Physics 1B | 0 | 0 | 4 | 1 |
| ZOO 101 | Introductory Zoology I | 3 | 0 | 0 | 3 | ZOO 102 | Introductory Zoology II | 3 | 0 | 0 | 3 |
| ZOO 103 | Experimental Zoology I | 0 | 0 | 3 | 1 | ZOO 104 | Experimental Zoology II | 0 | 0 | 3 | 1 |
| SER 001 | Use of English | 2 | 0 | 0 | 2 | SER 001 | Use of English | 2 | 0 | 0 | 2 |
| | **Total** | | | | **21** | | **Total** | | | | **21** |

### PART II

| HARMATTAN SEMESTER | | | | | | RAIN SEMESTER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **L** | **T** | **P** | **U** | **Course Code** | **Course Title** | **L** | **T** | **P** | **U** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BCH 201 | Introduction to Cell and Molecular Biology I | 2 | 0 | 0 | 2 | BCH 204 | Introduction to Cell and Molecular Biology II | 2 | 0 | 0 | 2 |
| BCH 203 | Chemistry of Macromolecules | 2 | 0 | 0 | 2 | BOT 102 | Introductory Botany II | 3 | 0 | 0 | 3 |
| BOT 101 | Introductory Botany I | 3 | 0 | 0 | 3 | BOT 104 | Experimental Botany II | 0 | 0 | 3 | 1 |
| BOT 103 | Experimental Botany I | 0 | 0 | 3 | 1 | BOT 202 | Biometry | 2 | 1 | 0 | 3 |
| CHM 201 | Basic Inorganic Chemistry | 3 | 1 | 0 | 4 | CHM 202 | Basic Organic Chemistry | 3 | 1 | 0 | 4 |
| CHM 203 | Basic Physical Chemistry | 3 | 1 | 0 | 4 | CHM 206 | Experimental Organic Chemistry II | 0 | 0 | 4 | 1 |
| CHM 205 | Experimental Physical/Inorganic Chemistry | 0 | 0 | 4 | 1 | MCB 202 | General Microbiology II | 2 | 0 | 3 | 3 |
| MCB 201 | General Microbiology I | 2 | 0 | 3 | 3 | FSC 202 | Entrepreneurship for Science Students II | 2 | 0 | 0 | 2 |
| FSC 201 | Entrepreneurship for Science students I | 2 | 0 | 0 | 2 | SE | Special Elective | 2 | 0 | 0 | 2 |
| SE | Special Electives | 2 | 0 | 0 | 2 | | | | | | |
| | **Total** | | | | **24** | **Total** | | | | | **21** |

## PART III

| **HARMATTAN SEMESTER** | | | | | | **RAIN SEMESTER** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **L** | **T** | **P** | **U** | **Course Code** | **Course Title** | **L** | **T** | **P** | **U** |
| BCH 301 | General Biochemistry I | 2 | 1 | 0 | 3 | BCH 302 | General Biochemistry II | 2 | 1 | 0 | 3 |
| BCH 305 | Functional Biochemistry | 2 | 0 | 0 | 2 | BCH 306 | Nutritional Biochemistry | 2 | 0 | 0 | 2 |
| BCH 307 | Experimental Biochemistry I | 0 | 0 | 3 | 1 | BCH 308 | Experimental Biochemistry II | 0 | 0 | 3 | 1 |
| BCH 309 | Physical Biochemistry | 2 | 0 | 0 | 2 | BCH 310 | Protein Structure and Function | 2 | 0 | 0 | 2 |
| BOT 203 | Introductory Genetics and Evolution | 3 | 0 | 3 | 4 | BCH 312 | Student Industrial Work Experience | 0 | 0 | 9 | 3 |
| CHM 307 | Application of Spectroscopic Methods | 2 | 1 | 0 | 3 | BCH 314 | Biochemistry of Plant Secondary Metabolites | 2 | 0 | 0 | 2 |
| CSC 201 | Computer Programming I | 2 | 0 | 3 | 3 | BCH 316 | Fundamentals of Bioinformatics | 2 | 1 | 0 | 3 |
| SE | Special Elective | 2 | 0 | 0 | 2 | FE/SE | Free Electives / Special Elective | 2 | 0 | 0 | 2 |
| | **Total** | | | | **20** | | **Total** | | | | **18** |

## PART 1V

| **HARMATTAN SEMESTER** | | | | | | **RAIN SEMESTER** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **L** | **T** | **P** | **U** | **Course Code** | **Course Title** | **L** | **T** | **P** | **U** |
| BCH 401 | Enzymology | 2 | 1 | 0 | 3 | BCH 402 | Biochemistry of Immune System | 2 | 0 | 0 | 2 |
| BCH 403 | Lipids and Biomembranes | 2 | 1 | 0 | 3 | BCH 404 | Biochemical Toxicology | 2 | 0 | 0 | 2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| BCH 405 /MOB 405 | Physicochemical Methods in Biochemistry and Molecular Biology | 2 | 0 | 0 | 2 | BCH 406 | Seminars and Scientific Communication in Biochemistry | 1 | 0 | 0 | 1 |
| BCH 407 | Nucleic acid and Protein Synthesis | 2 | 0 | 0 | 2 | BCH 412 | Laboratory Techniques in Biochemistry II | 0 | 0 | 6 | 2 |
| BCH 409 | Clinical and Forensic Biochemistry | 1 | 0 | 0 | 1 | | | | | | |
| BCH 411 | Laboratory Techniques in Biochemistry I | 0 | 0 | 6 | 2 | BCH 414 | Research Project II | 0 | 0 | 9 | 3 |
| BCH 413 | Research Project I | 0 | 0 | 9 | 3 | MOB 402 | Applications of Biochemistry and Biotechnology | 2 | 0 | 0 | 2 |
| MOB 401 | Principles of Molecular Biology | 2 | 0 | 0 | 2 | RE | Restricted Electives (max 4 units) | 2 | 0 | 0 | 4 |
| SE | Special Elective | 2 | 0 | 0 | 2 | FE | Free Electives | 2 | 0 | 0 | 2 |
| | **Total** | | | | **20** | | **Total** | | | | **18** |

### 3.2.7 Course Content

**BCH 201: Introduction to Cell and Molecular Biology I - 2 + 0 + 0 (2 units) Harmattan Semester**

Cell structure and function; prokaryotic and eukaryotic cell structures and their comparisons; the basis of cellular and subcellular organizations; concepts of compartmentation and tissue specialization in plant, animal, bacterial and fungal cells; The origin of life; heredity; the integration of genetics and biochemistry; the central dogma.

**BCH 202: Cell and Molecular Biology 2 + 0 + 0 (2 units) Rain Semester (For Non-Biochemistry major)**

Principles of the chemical basis of life. The molecular basis of cellular structure: polysaccharides, lipids, proteins, nucleic acid; the cellular basis of life: organization and function of the cell nucleus; structure and function of cell membranes; cell differentiation and proliferation; cell metabolism, enzymes, digestion, anabolism and catabolism, energy release and utilization in the cell; main techniques used in cell biology.

**Prerequisites: CHM 101 & 102**

**BCH 203: Chemistry of Macromolecules 2+0+0+2 (2 unit) Harmattan Semester**

Chemistry of carbohydrates, lipids, amino acids and proteins (primary, secondary, tertiary and quaternary structures of proteins), nucleic acids and nucleoproteins, Introduction to Biomembranes

**Prerequisites: CHM 101 & 102**

**BCH 204: Introduction to Cell and Molecular Biology II 2+0+0 (2 Units) Rain Semester**

Molecular nature of the gene. Genes – structure, organization and expression. Recombination and transposition. Cytoskeleton and Cellular movements - structure and function of cytoskeleton; molecular motors (myosins, kinesins and dyneins); cell division, cell differentiation and cell death; cell-cell signaling.

**Prerequisite: BOT 101/ ZOO 101, CHM 101 & 102**

**BCH 301: General Biochemistry I: 2 + 1 + 0 (3 units) Harmattan Semester**
Properties of water, acids, bases and buffers; pH and pKa values and their effects on cellular activities. Introduction to Enzymes; kinetics of enzyme action and inhibition, Co-enzymes; Vitamins; Hormone and Bioenergetics.
**Prerequisites: CHM 101 & 102, BCH 201 & BCH 204.**

**BCH 302: General Biochemistry II – 2 + 1 + 0 (3units) Rain Semester**
Methods of studying metabolism. Metabolism of carbohydrates, lipids, amino acids; electron transport chain and oxidative phosphorylation; metabolism of purines, pyrimidines and nucleotides. Regulation of metabolic processes.
**Prerequisites: CHM 101 & 102, BCH 201 & 204**.

**BCH 303: Introductory Biochemistry I –2+ 0 + 4 (3units) Harmattan Semester (for non-biochemistry major)**
pH and buffers; structure of cells - intracellular organization and organelles functions. Methods of cell fractionation. Intracellular localization of enzymes and biochemical activities. Chemistry of the major constituents of the cells: carbohydrates, lipids, proteins, nucleic acids and nucleoproteins. Coenzymes: structure and function; enzyme kinetics; mechanism of enzyme action and control of enzymatic action. Bioenergetics.
**Prerequisites: CHM 101 & 102**

**BCH 304: Introductory Biochemistry II – 2 + 0 + 4 (3 units) Rain Semester (for non-biochemistry major)**
Metabolism of carbohydrates, lipids, amino acids, nucleic acids and proteins. DNA replication, transcription, protein synthesis, recombinant DNA technology. Photosynthesis. Regulation of metabolism. Hormones, electron transport and oxidative phosphorylation. Molecular biology of bacteriophage lambda. Biochemistry of animal viruses, acquired immunodeficiency syndrome (AIDS). Neurotransmission, Vision, special topics in Biochemistry.
**Prerequisites: CHM 101, 102 & BCH 303**.

**BCH 305: Functional Biochemistry 2 + 0 + 0 (2 units) Harmattan Semester**
Body fluids, electrolytes and homeostasis; Vascular - plasma constituents, circulation and diseases; Red blood cells-constituents and metabolism, Turnover; blood clotting; White blood cells; Platelets-Structure and function. Endocrine organs-pituitary, adrenal, gonads, thyroids and parathyroids, pineal, other organs; Hormones and mechanism of action. Musculoskeletal system – Biochemistry of muscle, contractile process; biochemistry of connective tissues. Introduction to the immune system – nature of humoral and cellular immunity; Biochemistry of vision
**Prerequisite: BCH 201 & 204**

**BCH 306: Nutritional Biochemistry 2 + 0 + 0 (2units) Rain Semester**
Food nutrients, energy values of foods and energy expenditure by mammals. Nutritive value of foods – carbohydrates, fats, proteins, vitamins, mineral elements and water; digestion and absorption; Biochemistry and Metabolic functions of Body organs-liver, adipose tissue, muscles, pancreas, intestines, central nervous system and kidney; Integration and control of tissue

metabolism; Origin and control of metabolic diseases. Nutritional status and nutrient requirement in relation to physical activity and ageing, diet and diseases, obesity and under nutririon.
**Prerequisite: BCH 201 & 204**

**BCH 307 & 308: Experimental Biochemistry I & II: 0 + 0 + 3 (1 unit) Harmattan & Rain Semesters**
Techniques by which the chemical and physical properties of fundamental components of the cell are studied. Test for carbohydrates, spectrophotometry, and preparation of standard calibration curves. Estimation of proteins, carbohydrates and nucleic acids concentration. Isolation of DNAs and RNAs, determination of concentration of albumin in serum, ascorbic acid in urine and fruits. Electrophoresis of serum proteins, separation techniques, isolation of enzyme from cells and tissues, determination of kinectic parameter of enzyme.
**Prerequisite: BCH 201 & 204**

**BCH 309: Physical Biochemistry – 2+0+0+2**
Manipulating algebraic expressions, priority rules for operators, functions, plotting graphs, exponents and logarithms, differentials calculus, integral calculus, partial differentiation. Law of thermodynamics, chemical equilibrium, binding of ligands to macromolecules, oxidation – reduction process in electrochemical cells, chemical kinetics, thermodynamics of solutions, acids and bases.
**Prerequisites: CHM 101 and CHM 102**

**BCH 310: Protein structure and function – 2 + 0 + 0 (2units). Rain Semester**
Classification of proteins with examples from important groups; Level of structural organization of protein; Amino acid sequence and evolution; Reactions of amino acids; Secondary, tertiary and quaternary structure of proteins. Peptide and protein synthesis by chemical means. Protein folding and misfolding; Protein conformation. Three dimensional structure determination using X-ray diffraction and NMR (including the display and manipulation of structural information on the computer); Protein-protein and molecular interactions (ligand and proteins); Correlation of structure with functions in a few specific proteins; Role of proteins in Supramolecular structures such as chromosomes, viruses etc; Techniques for studying protein structure, including purification and characterization.
**Prerequisite: BCH 301.**

**BCH 312: Students Industrial Work Experience (SIWES) (3 Units)**
Approved and supervised technical work experience in an industrial setting for 3 or 4 months at the end of Rain Semester Part III. Technical report is required.
**Prerequisites: BCH 301**.

**BCH 314: Biochemistry of Plant Secondary Metabolites 2+0+0 (2 units) Rain Semester**
Photosynthesis, Plant secondary metabolites, alkaloids and flavonoids, plant hormones, biosynthesis of plant development, 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.
**Prerequisites: BCH 301.**

**BCH 316: Fundamentals of Bioinformatics 2+0+0 (2units) Rain**

What is bioinformatics (why is bioinformatics important); introduction to the principles and methods of bioinformatics and computational biology; sequencing and sequence analysis (homology and analogy); folding, pattern recognition and prediction (the roles of chaperones); genome projects (status of the human genome project); information networks (facilities on the internet, WWW, Web browsers, HTTP, HTML and URLs, EMBnet, NCBI, Web addresses); introduction to web-based molecular biology and bioinformatics databases - Protein information resources (biological, primary sequence, composite protein sequence, secondary databases, composite protein pattern and structure classification databases, Web addresses) and genome information resources (DNA sequence databases and specialized genomic resources); DNA sequence analysis(cDNA libraries); introduction to pairwise and multiple sequence alignment techniques.

**Prerequisites: BCH 201 & 204**

**BCH 401: Enzymology – 2 + 0 + 0 (2units) Harmattan Semester**

Enzyme classification and nomenclature; three-dimensional structure of enzymes; structure-function relationship. Chemical catalysis (transition state theory, principles of catalysis, covalent catalysis, nucleophilic catalysis, principles of microscopic reversibility, kinetic isotope effects etc. Limitation of Michaelis-Menten equation, multi-substrate systems. Measurement and magnitude of enzyme rate constants, the pH dependence of enzyme catalysis; detection of intermediates in reactions, stereochemistry of enzymatic reaction; active site directed and enzyme activated irreversible inhibitors; cooperativity, allosteric interactions and regulations; thermodynamics of enzyme substrate interactions and binding energy in catalysis. Mechanisms of action of enzymes. The roles of enzymes in biochemical regulation.

**Prerequisites: BCH 301, BCH 302**

**BCH 402: Biochemistry of Immune System 2+0+0 (2units) Rain Semester**

Basic concepts of immunology; structure of antigens; antigenic determinants and cellular response; structure and activation of the T-cell antigen receptor; structure and classification of immunoglobulins and antibodies; antigen and antibody interaction; genetic basis of antibody diversity; the complement system in immune response; hypersentivity, immuno-pathology, autoimmunity; tumour and transplantation immunology; immunochemical techniques; haemagglutination and complement fixation, precipitation reactions; immunoblotting, isolation of lymphocyte population; cytotoxic assay; use of monoclonal antibodies.

**Prerequisite: BCH 305**

**BCH 403: Lipids and Biomembranes– 2 + 0 + 0 (2units) Harmattan Semester**

A survey of the structure, functions, biosynthesis and catabolism of different classes of Lipids. The regulatory aspects of biosynthesis and catabolism of the lipids especially in relation to homeostasis in the organism will be stressed. The lipids include; fatty acids, glycerides and phosphoglycerides, prostaglandins, terpenoids and steroids such as bile acids, steroid hormones, carotenoids and vitamin A, vitamin D and terpenoid quinones. Steroid hydroxylation, mode of action of steroid hormones. Hormonal regulation of metabolism. Regulation of fatty acids metabolism.

**Prerequisites: BCH 301, 302 & 305**.

**BCH 404: Biochemical Toxicology – 2 + 0 + 0 (2units) Rain Semester**

Brief review and current concepts in biochemistry and cell biology; Review of metabolism; Metabolism of drugs and foreign compounds; Dose and Time responses; Biochemical mechanisms of toxicity; Cellular defense systems, including enzymatic basis of detoxification; Oxidative stress and neurodegeneration; Reactive metabolite and immunotoxicity; Signal transduction in toxicology; Organ specific toxicity; Genetic toxicology; Cancer and tumourigenesis; Statistical methods in toxicology; Experimental methods in toxicology; Ethno-and chemotherapeutic agents; Drug resistances and other factors affecting drug efficacy.
**Prerequisites: BCH 301, 302, 305 & 306**

**BCH 405: Physicochemical Methods in Biochemistry and Molecular Biology 2 + 0 + 0 (2 units) Harmattan Semester**

The theory and application of techniques used to address biochemical problems: Preparation of solutions; theory and practice of separation techniques – ultracentrifugation, gel electrophoresis, gel filtration, affinity chromatography, ion-exchange chromatography, isoelectric focusing, two-dimensional gel electrophoresis; Optical methods (e.g. light scattering, optical rotatory dispersion and circular dichroism, refraction, infrared visible and ultraviolet absorption, fluorescence, phosphorescence). Electron microscopy, X-ray diffraction, nuclear magnetic resonance, radioisotope techniques. Viscosity, diffusion, dielectric constant, osmometry ;purification and fractionation of DNAs, spectroscopic measurement of protein and nucleic acid concentrations; isolation of cDNA, hybridization; polymerase chain reaction; autoradiography; Northern, southern and Western blotting; site-directed mutagenesis; molecular cloning methods; DNA sequencing methods; DNA fingerprinting and DNA typing; Restriction mapping; ELISA; immunoblotting;
**Prerequisites: BCH 301, CHM 307**

**BCH 406: Seminars and Scientific Communication in Biochemistry 1 + 0 + 0 (1units) – Rain Semester**

Project Reporting/Thesis Writing; Seminar presentations on the results of their research. The topics can also be based on current trends in biochemical literature.
**Prerequisites: BCH 301, 302 & 305**.

**BCH 407: Nucleic Acid and Protein Synthesis 2 + 0 + 0 (2units) Harmattan Semester**

Structure and Properties of nucleotides and nucleic acids. Hydrolysis of nucleic acids. Elucidation of DNA structure and properties. Unique and repetitive DNA sequences. Aspects of phages and bacterial genetics. Mechanism of replication. Prokaryotic and eukaryotic DNA polymerases and ligases. Restriction endonucleases, recombinant DNA technology. mRNA polymerase and transcription. Structure and function of rRNA, tRNA and mRNA in prokaryotes and eukaryotes. Genetic code. Protein synthesis and mechanism of protein synthesis. Control of gene expression.
**Prerequisites: BCH 301 and 302**

**BCH 408: Microbial Physiology and Biochemistry 2 + 0 + 0 (2units) Rain Semester**

Cell wall of bacteria and yeast. Antibiotics. Toxins. Structure and Function of flagella and cilia; differentiation of slime moulds. Regulation of chromosome replication. Mechanisms of nitrogen fixation, alkaloids. Secondary metabolites, cyclic nucleotides.
**Prerequisites: BCH 301 and 302**

**BCH 409: Clinical and Forensic Biochemistry 1 + 0+0 (1 unit) Harmattan Semester**

Diagnostic enzymes; pathological urine; collection, preservation and analysis of materials of forensic interest; clinical uses of antibiotics; legal issues in forensic practices; application of biotechnology in forensic practices; the public analyst in forensic practices
**Prerequisites: BCH 301 and 302**

**BCH 410: Biophysics 2 + 0 + 0 (2units) Rain Semester**
Definition of Biophysics. Physical chemical principles and methods, in theory and methods of macromolecular structure determination, and structure-based computational analysis. Quantitative physical chemistry of biological systems, structure determination and analysis of macromolecules, and computational analysis of biomolecular systems. Study of complex biological phenomena using quantitative, physical methods.
**Prerequisites: BCH 306 & 405**

**BCH 411 & 412: Advanced Laboratory Techniques in Biochemistry I & II 0 + 0 + 6 (2units) Harmattan and Rain Semesters**
Practical experience in experiments involving cell fractionation, protein purification, spectrophotometry, electrophoresis, chromatography, and ultracentrifugation and other advanced biochemical techniques.
**Prerequisites: BCH 301 & 302**

**BCH 413 & 414 - Research Project I & II (6 units) Sessional**
A research problem under the direction of a faculty member/supervisor. The project may take the form of original research or literature review. It should be submitted two weeks before the examinations held in the expected final semester.
**Prerequisites: BCH 301 & 302**

**MOB 401: Principles of Molecular Biology 2+0+ (2 units) Harmattan**
The molecular biology of development; the generation of immunological specificity; the diversity of eukaryotic viruses; human genetics diseases ( the molecular genetics of diseases, molecular analysis of single gene disorders, genetic analysis of complex disease, gene therapy); carcinogenesis ( the control of cell proliferation; the genetic basis of cancer; the origins of human cancer, gene defects and disease, methods of detecting gene mutations); the molecular basis of antibiotic action biochemical targets for drug action, inhibitors of bacterial cell wall synthesis, drugs affecting the function of cytoplasmic membrane, inhibitors of nucleic acid synthesis and ribosome function, bacterial resistance to antibiotics, structure of human genome – human genome project; human genetics and society; Molecular biology of parasites and parasitic diseases malaria, trypanosomiasis etc.
Prerequisites: BCH 301, BCH 302

**MOB 402: Applications of Biochemistry and Biotechnology 2+0+0 (2 units) Rain**
Industrial application of enzymes, Enzyme mobilization, enzyme reactors. Continuous culture methods; principles and applications: Industrial fermentations (chemostat and its application in industrial fermentation). Brewery science: Methods for and selection of microorganisms of industrial importance. Induction of mutation in microorganisms and plants for the purpose of over-production. Strain selection/development enhancement. Gene dosage and its application in

industrial processes. Application of genetic engineering in industry, agriculture and medicine; Crop improvement (finding genes for better crops); plant tissue culture; plant genetic engineering; biotechnology and human health; making new vaccines and drugs; animal, fish and insect biotechnology; private and public biotechnology; genetic resources, environmental biotechnology. Research and development in biotechnology industries and bioenterpreneurship; intellectual property rights; ethical considerations; techniques of gene cloning and gene expression for industrial use, biotransformation for industrial use.

**MOB 407: Process Biochemistry 2+0+0 (2 units) Harmattan**

Review of Fermentation Processes ( microbial biomass, enzymes, metabolites, recombinant products, transformation processes); Microbial growth kinetics; the isolation, preservation and improvement of industrially important microorganisms; media for industrial fermentations; sterilization; the development of inoccula for industrial fermentation; design of a fermenter; introduction and control; aeration and agitation; the recovery and purification of fermentation products; effluent treatment; fermentation economics; separations in pharmaceutical manufacturing; membrane pervaporation; tangential flow filtration; supercritical fluid extraction/chromatography; preparative separation of enantiomers; chromatographic purification of recombinant protein products.

Prerequisites: BCH 201, 204, MTH 201

## 4.0 POSTGRADUATE PROGRAMME

### 4.1 INTRODUCTION

Graduate studies in the Department of Biochemistry and Molecular Biology are designed to offer intensive experience in special areas of biochemistry with emphasis on certain research programme and also industrial aspects of biochemistry.

### 4.2 Objectives of the Programme

The main objectives of this programme are:

(a) training in the methods of pursuing an academic career in research and/or teaching higher institutions of learning

(b) training and improvement in various biochemical techniques and methods beyond first degree level for those who are needed in industries e.g. food, brewery, and pharmaceutical industries where there is increasing demand for biochemists with industrial orientation.

### 4.3 The Degrees to be offered

This programme shall offer three types of degrees:

(i) Master of Science (M.Sc.) degree
(ii) Master of Philosophy (M.Phil.) degree
(iii) Doctor of Philosophy (Ph.D) degree

### 4.4 Admission Requirements

#### I. General Admission Requirements

**(a) M.Sc. Degree (Biochemistry)**

(i) Candidates registering for an M.Sc shall be prepared to pursue a course of minimum of 24 months duration.

(ii) The M.Sc degree programme is opened to candidates holding at least a Second Class Lower Degree in Biochemistry or Second Class Upper Degree in a field closely related to Biochemistry such as Chemistry, Pharmacy, Medicine, Agriculture, Food Science, Microbiology or Biology.

(iii) Any candidate, particularly non-Biochemistry majors, may be required to take remedial courses without credit, when recommended to do so by the Head of Department. In some cases, a longer study programme may be necessary.

**(b.) M.Phil. Degree (Biochemistry)**

A minimum of Second Class (Upper Division) honours degree in Biochemistry, Chemistry or related fields. Special consideration will be given to applicants with M.Sc. degrees in Biochemistry or related fields who have obtained an average of less than 60% (B+) in course work results, required for Ph.D registration.

The duration is a minimum of 18-24 months. M.Phil in Biochemistry is based on course-work (6 units) for M.Sc graduates of Obafemi Awolowo University, Ile-Ife and 18 Units for graduates of other university or related disciplines.

**(c.) PhD Degree (Biochemistry)**

The Ph.D degree programme is opened to candidates holding an M.Sc with Thesis or M.Phil. degree preferably in Biochemistry. In special cases, candidates qualified in a field very closely related to Biochemistry will be accepted. In the latter case, the candidate might be required to take supplementary courses without credit.

## 4.5 Course Registration

### 4.5.1 Course Requirements for M.Sc Degree

An M.Sc candidate will be required to deliver a seminar on a topical issue in biochemistry during the degree programme. He must also present a seminar on his completed thesis before his final examination.

In order to qualify for an M.Sc degree, a candidate must take a minimum of 24 units of study as follows.

**1. Compulsory Courses:**

BCH 600 - Advanced Laboratory Course - 3 Units

BCH 601 - Advanced Intermediary Metabolism - 2 Units

BCH 602 - Seminar and Independent Studies - 3 Units

**Sub-Total – 8 Units**

**2. Selected Courses**

At least six units of courses may be chosen from BCH 603 to BCH 612. Four units may be taken from other departments in the Faculty of Science and/or cognate faculties (subject to the approval of the Departmental Postgraduate Committee)

Sub-Total - 10 Units

3. **Thesis** - 6 Units

**Grand Total - 24 Units**

### 4.5.2 Course requirements of M.Phil

The course requirements are as enumerated for M.Sc degree programmes. For M.Sc degree holders of Obafemi Awolowo University, Ile-Ife, candidate will be required to take 3-4 units of course-work, while a graduate of other university will take 12 units of course-work.

An M.Phil candidate will deliver a seminar every semester in addition to his intensive research work. He or she must submit a research thesis according to the university regulations.

### 4.5.3 Course requirement for Ph.D Degree

A Ph.D candidate will not offer any course except for where the candidate is expected to take supplementary courses as directed by the Head of Department.
In addition, a Ph.D candidate will be expected to deliver a seminar every semester on the degree programme.

A Ph.D Candidate must submit a thesis according to the University regulations. He must also present a Seminar on his completed thesis before his final Oral Examination.
All candidates for the Ph.D Degree shall after completing the required course-work be further required to pass a qualifying examination as laid down in the University regulations not later than one year after registration.

## 4.6. The Programme

### (A) Courses

**Courses available in the Department**

**M.Sc**

| CODE | COURSE TITLE | UNITS |
|---|---|---|
| BCH 600 | Advanced Laboratory Course | 3 |
| BCH 601 | Advanced Intermediary Metabolism | 2 |
| BCH 602 | Seminar and Independent Studies | 3 |
| BCH 603 | Advances in Protein Chemistry | 3 |
| BCH 604 | Advances in Enzymology | 2 |
| BCH 605 | Industrial Biochemistry | 3 |
| BCH 606 | Advanced Molecular Biology | 3 |
| BCH 607 | Biochemical Toxicology | 3 |
| BCH 608 | Biological Membranes | 3 |
| BCH 609 | Current Topics in Cellular Regulations | 3 |
| BCH 610 | Immunochemistry | 3 |
| BCH 611 | Neurochemistry | 2 |
| BCH 612 | Biochemical Basis of Clinical Chemistry | 2 |
| BCH 613 | Thesis | 6 |

**M.Phil**

| | | |
|---|---|---|
| BCH 614 | Biochemistry of Plant Products | 3 |
| BCH 615 | Biochemical Basis of Diseases | 3 |
| BCH 616 | Advanced Biochemical Methods | 3 |
| BCH 617 | Biotechnology and Bioinformatics | 3 |

## 4.7 EXAMINATION REQUIREMENTS

1. *M.Sc Degree*

Assessment of a candidate for an M.Sc will be in four parts:

(i) *BCH 600: Advanced Laboratory Course*

The performance in this course will be assessed by continual assessment of the student and/or by written examination.

(ii) *Written papers on courses*

Compulsory courses BCH 601 and BCH 602 and selected courses will be assessed in written papers or any other form the department might consider useful.

(iii) *Thesis*

A thesis, describing original work carried out during the degree programme, will be submitted by the candidate according to the University Regulations. The candidate shall present a seminar on his completed thesis before presenting himself for the oral examination.

(iv) *Oral Examination*

After submission of the thesis, the candidate will be examined orally by a board of examiners, as specified by University Regulations

2. M.Phil Degree: As enumerated for an M.Sc degree student.

3. Ph.D Degree

A candidate registered for the Ph.D degree must submit to the Department, at the end of the first session, a comprehensive research proposal, for assessment by a committee, as specified by University regulations. The document must include review of the present knowledge of the field of research as well as the future trends and research methodologies.

In order to qualify for the award of Ph.D degree, a candidate must submit a thesis which should be an original work carried out while studying for the degree and written in the form specified by University Regulations. The candidate shall present a seminar on his completed thesis before presenting himself for the oral examination.

After submission of the thesis, the candidate must be orally examined by a Board of Examiners according to University Regulations.

## 4.8 Main Fields of Research

*i. Enzymes and Protein Science*

Structures, regulations and mechanism of action of enzymes: physical and chemical studies of soluble and membrane proteins, protein folding; industrial enzymology..

*ii. Lipids and Membranes*

Biosynthesis, Isolation, and characterization of physiologically active lipids. Studies of natural products which affect the integrity of biological membranes.

*iii. Cell Biology and Medicinal Chemistry*

Toxicology, Lysosome stability; Polynucleotide synthesis and interferon induction, Lectin characterization and interaction with polysaccharides, chemistry of natural products.

**4.9 Course Contents:**

*BCH 600 Advanced Laboratory Courses (1+0+6) 3 units*

This is a lecture plus practical courses covering a wide range of biochemical techniques. Some of which are currently in use in research projects in the Department. It is aimed at improving the manipulative skills of the student and familiarizing the student with a variety of preparative and analytical techniques.

*BCH 601 Advanced Intermediary Metabolism (2+0+0) 2 Units*

Recent advances in intermediary metabolism; biochemical factors and principles important for achieving integration and co-ordination of metabolic pathway, interaction of various type of regulation in specific systems; biochemical reaction mechanisms.

*BCH 602 Seminar and Independent Studies (3+0+0) 3 Units*

Each student will be required to deliver seminars on selected topics and submit a written paper on a specific subject or problem of current interest in Biochemistry and related disciplines. Special attention will be paid to the art of writing scientific manuscripts.

*BCH 603 Advances in Protein Chemistry (3+0+0) 3 Units*

Determination of protein sequence and conformation. Chemical modification of proteins. Non-catalytic proteins with specialized functions

*BCH 604 Advances in Enzymology (2 + 0 + 0) 2 Units*

Kinetics of enzyme catalyzed reactions; mechanisms of enzyme action, structure-function relationship, regulatory properties.

*BCH 605 Industrial Biochemistry (3+0+0) 3 Units*

Enzyme biotechnology (isolation, production and immobilization of enzymes), enzyme reactors; the direct use of isolated enzymes from microbial plant, and other sources as well as enzymes in intact organisms in brewery, food, pharmaceuticals, detergents, agriculture, environment, energy, medicine and chemical industries. Fermentation pathways in different micro-organisms and control of fermentation products in industrially important micro-organisms. Microbial transformation of drugs.

*BCH 606 Advanced Molecular Biology (3+0+0) 3 Units*

Physicochemical properties and analysis of fine structures of nucleic acids, properties and analysis of DNA and RNA molecules. Latest research on the mechanism and control of replication, transcription and translation, cloning. Recombinant DNA and special techniques in molecular biology.

*BCH 607 Biochemical Toxicology (3+0+0) 3 Units*

Survey of toxins such as naturally occurring toxins, drugs, and insecticides. Mode of action of toxins, structure-activity relationship; analysis of cell damage, industrial toxicology, environmental toxicology.

*BCH 608 Biological Membranes (2+0+0) 2 Units*

Characterization and composition of biological membranes. Lipid-protein interactions. Structure and dynamics of membranes, mechanism of assembly of membranes. Functional aspects of membranes e.g. transport across membranes, membrane receptors, electron transport and oxidative phosphorylation.

*BCH 609 Current Topics in Cellular Regulation (2+0+0) 2 Units*

Biochemistry of development and differentiation. Inter and intracellular communication and regulation. The biology and biochemistry of cancer. Recent advances in cellular regulation.

*BCH 610 Immunochemistry (2+0+0) 2 Units*

Structure, biosynthesis, secretion and genetics of antibodies, molecular basis of antigenicity and the nature of antibody-antigen reactions.

*BCH 611 Neurochemistry (2+0+0) 2 Units*

Mechanism of action of the nervous impulse. Functional activity of neurotransmitters. Neurotransmitters and receptors. Biochemical analysis of memory.

*BCH 612 Biochemical Basis for Clinical Chemistry (2+0+0) 2 Units*

Techniques used in analysis of clinical specimens, water and electrolyte balance. Enzymes in diagnosis. Hormone assays. Clinical metabolic studies.

*BCH 614 Biochemistry of Plant Products (3+0+0) 3 Units*

Biosynthesis and biological activities of alkaloids, carbohydrates, flavonoids, phenolic acids, nucleotides, peptides. Review of biologically occurring toxins. Mechanisms and effects of naturally occurring toxins.

*BCH 615 Biochemical Basis of Diseases (3+0+0) 3 Units*

Water and Electrolyte Balance. Acid Base Regulation. Case studies in molecular medicine and the biochemical basis of diseases – diabetes, cancer and diseases arising from inborn errors of metabolism. Biochemical causes of Hypertension, Myocardial infraction and Coronary Heart Disease (CHD), Cardiac Markers and Lipid Profile. Trace Elements and vitamins deficiency Disorders. Biochemistry of kidney and liver diseases. Organ Function Tests. Haemoglobinopathies. Bone disorder. Endocrinopathy. Biochemistry of Nervous and Muscle Disorder. Radioisotopes in Medicines.

*BCH 616 Advanced Biochemical Methods (3+0+0) 3 Units*

Advances in isolation and purification methods. Methods in nucleic acids research (isolation of cDNA, PCR, hybridization, blotting). Application of absorption and fluorescence spectroscopy, Optical Rotating Dispersion and Circular Dichroism, Nuclear Magnetic Resonance mass spectrometry, electron microscopy, X-ray diffraction. Chromatography's scale-up processes. Two-dimensional Electrophoresis. Radioisotope. Autoradiography, Hydrodynamic methods. Immunological methods and radioimmunoassay.

*BCH 617 Biotechnology and Bioinformatics (3+0+0) 3 Units*

Application of genetic engineering in industry, agriculture and medicine. Genetic resources. Ethics of biotechnology applications, Principles and methods of bioinformatics and computational biology. Genome projects, Information networks and databases. DNA/protein sequence annotation tools. Databases, concepts of proteome, transcriptome and metabolosome. Molecular modeling.