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*Faculty of Basic Medical Sciences,  
Ladoke Akintola University of Technology,  
Ogbomoso.*

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## **Faculty Handbook 2015**

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## INTRODUCTION

The Faculty of Basic Medical Sciences was established in October 1991 with three departments; Anatomy, Biochemistry and Physiology. The Faculty was set up to train undergraduate medical students in pre-clinical and laboratory medicine, and prepare them for their future training in clinical medicine. The foundation Provost/Dean of the Faculty was late Professor Toriola Feisetan Solanke, a Professor of Surgery from the University of Ibadan, Ibadan, Nigeria. After his tenure, he was succeeded by Prof J. B. Familusi, also from the University of Ibadan.

Recruitment of permanent academic staff posed a major challenge for the University Administration; therefore the Faculty depended largely on Associate Lecturers and staff on sabbatical leave from other Universities. The first permanent staff was Dr. D. A. Aremu of the Department of Physiology. Later, the University succeeded in recruiting other staff including Dr. O. A. Adeyeba (who became the first Professor by promotion in the Faculty in 2003) and others. The Faculty started with 35 medical students in 1991. This number gradually increased reaching a peak of over a thousand in 2004. The students were drawn from several States of the Federation but the vast majority of them from Oyo and Osun States.

The medical laboratory science (BMLS) programme commenced in August 2002, with the aim of training medical laboratory scientists to acquire both academic and professional expertise to work in hospital laboratories and research institutes. Prior to this, the Bachelor of Nursing Science (BNSc) programme had commenced in 2001 with the 100 and 200 levels programme handled by the Faculty while the 300-500 levels handled by the Faculty of Clinical Sciences.

The Bachelor of Technology (BTech) programme started in 2003

to provide functional and practical training in various disciplines of Anatomy, Biochemistry and Physiology with the aim of producing graduates who can contribute meaningfully to academic and technological development in Nigeria. The BTech programme started first with Physiology in 2003 while Anatomy started the following year and later Biochemistry. The commencement of these programmes was an important landmark in the history of the Faculty.

The Faculty is located in two campuses of the University; Ogbomoso in Oyo State, and Osogbo in Osun State. The Departments of Anatomy, Biochemistry and Physiology are located in Ogbomoso while the Departments of Chemical Pathology, Haematology, Medical Microbiology & Parasitology, Morbid Anatomy & Histopathology, Pharmacology & Therapeutics and Medical Laboratory Sciences (Biomedical Sciences) are located in Osogbo.

The Administrative building of the Faculty, which was initially located within the main campus in Ogbomoso, but now in the new College of Health Sciences (Annex) building complex, houses the Dean, Faculty Officer, Faculty Accountant, Faculty Auditor, Faculty Librarian and other staff of the Faculty. A smaller administrative block which houses the Dean and Administrative Officers is located in the College of Health Science main campus, Isale Osun, Osogbo.

## **RELEVANCE AND ACTIVITIES OF THE FACULTY**

The Faculty oversees and coordinates the MBBS programmes of the College of Health Sciences. Both the Part I and Part II MBBS programme courses are available in the Faculty. The Part III and Part IV MBBS programme courses are available in the Faculty of Clinical Sciences. These programmes together with those coordinated by the Faculty of Clinical Sciences lead to the award of Bachelor of Medicine and Bachelor of Surgery (MBBS) degree at the end of 6 years training programme.

In addition, the Faculty of Basic Medical Sciences oversees and coordinates the BTech programmes in the Departments of Anatomy, Biochemistry and Physiology which lead to the award of Bachelor of Technology (BTech) degree in the respective departments after 5 years of training. Similarly, the Faculty oversees the Bachelor of Medical Laboratory Sciences programme of the Department of Biomedical Sciences that leads to the award of Bachelor of Medical Laboratory Science (BMLS) degree at the end of 5 year training programme. In conjunction with the Faculty of Clinical Sciences, the Faculty also oversees the programme of the Bachelor of Nursing Science (Full time & Part time) that leads to the award of BNSc degree after 5 or 6 years training programme respectively.

Finally, the Faculty oversees and coordinates the various Postgraduate programmes in the Departments of Medical Microbiology & Parasitology, Chemical Pathology, Pharmacology and recently Biochemistry. The programmes

include Postgraduate Diploma (PGD), Master of Technology (MTech)/Master of Science (MSc), Master of Philosophy (MPhil) and Doctor of Philosophy (PhD).

The Faculty interacts and provides academic support or advice to cognate Faculties in the University. Members of staff of the Faculty also provide professional medical and laboratory services to the University Teaching Hospital.

### **PAST AND PRESENT DEANS**

|    |                     |                |
|----|---------------------|----------------|
| 1. | Prof. M. A. Fafunso | 1998 2000      |
| 2. | Dr. J. Okwusidi     | 2000 2003      |
| 3. | Dr. O. A. Adeyeba   | 2003 2004      |
| 4. | Dr. A. O. Olowu     | 2004 2005      |
| 5. | Dr. V. O. Mabayoje  | 2005 2007      |
| 6. | Prof. A. H. Fagbami | 2007 2009      |
| 7. | Dr. V. O. Mabayoje  | 2009 2010      |
| 8. | Prof. A. H. Fagbami | 2010 2011      |
| 9. | Prof. S. S. Taiwo   | 2011 Till Date |

### **FACULTY OFFICE STAFF LIST (2013/2014)**

|     |                      |                               |
|-----|----------------------|-------------------------------|
| 1.  | Prof. S. S. Taiwo    | - Dean                        |
| 2.  | Dr. A. S. Adekunle   | -Deputy Dean                  |
| 3.  | Mr. A. O. Awoniyi    | -Faculty Officer              |
| 4.  | Mr. F. O. Ojo        | -Chief Confidential Secretary |
| 5.  | Mrs. Lawal L. O.     | -Principal Executive Officer  |
| 6.  | Mrs. G. A. Koleosho  | -Principal Executive Officer  |
| 7.  | Mrs. E. O. Odekunbi  | -Confidential Secretary I     |
| 8.  | Mr. E. S. Oyedokun   | -Principal Data Mgt Officer   |
| 9.  | Mrs. D. T. Alamu     | -Snr Data Mgt Officer         |
| 10. | Mrs. W. F. Adeniji   | -Chief Clerical Officer       |
| 11. | Mr. P. F. Balogun    | -Clerical Officer             |
| 12. | Miss L. A. Akinwale  | -Clerical Assistant           |
| 13. | Mrs. M. Salahudeen   | -Office Assistant             |
| 14. | Mrs. F. B. Oyedele   | -Office Assistant             |
| 15. | Mr. A. G. S. Agboola | -Faculty Finance Officer      |
| 16. | Mr. D. O. Oladipo    | -Faculty Auditor              |
| 17. | Mr. H. F. Ajibona    | -Faculty Librarian            |
| 18. | Mr. E. O. Oyedele    | -Senior Driver/Mechanic       |

## **LIST OF HEAD OF DEPARTMENTS (2013/2014)**

1. Mr A. J. Ajibade - Department of Anatomy
2. Dr. O. T. Adedosu - Department of Biochemistry
3. Dr. O. G Ayelaagbe - Department of Chemical Pathology
4. Dr. O. O. Akinpelu - Department of Haematology
5. Dr. E. O. Akanni - Dept. of Medical Laboratory Sciences
6. Dr. D. O. Ojurongbe - Department of Medical Microbiology & Parasitology
7. Dr. D. Sabageh - Department of Morbid Anatomy & Histopathology
8. Dr. B. L. Ajibade - Department of Nursing
9. Mr O. T. Kolawole - Dept. of Pharmacology & Therapeutics
10. Dr. A. S. Oyadeyi - Department of Physiology

## **(A) DEPARTMENT OF ANATOMY**

### **ACADEMIC STAFF**

1. Mr A. J. Ajibade - B.Sc; M.Sc (Lecturer I) - Coordinator
2. Dr. O. O. Oyewo - BSc; MBChB, MSc (Lecturer I)
3. Dr. E. A. Ashamu - MBBS, MSc (Lecturer I)
4. Dr. O. A. Adeeyo - MBBS, MSc (Lecturer I)
5. Mr. O. W. Akintunde - BSc, MSc (Lecturer I)
6. Dr. O. A. Alamu - MBBS, MSc (Lecturer I)
7. Mr. P. B. Fakunle - BSc, MSc (Lecturer II)
8. Dr (Mrs) A. Y. Onaolapo - MBBS, MSc (Lecturer II)
9. Mr. A. I. Jegede - BSc, MSc (Lecturer II)
10. Dr. O. T. Olayemi - MBBS, M.Sc (Lecturer II)

### **TECHNICAL STAFF**

1. Mr. J. A. Olayode - Principal Technologist
2. Mr. O. A. Oyewopo - Technologist II
3. Mr. A. Ajamu - Technologist II
4. Miss S. A. Gidigbi - Senior Laboratory Supervisor
5. Mr. V. O. Babarinde - Senior Laboratory Supervisor
6. Mr. J. A. Oloyede - Laboratory Supervisor
7. Mr. A. Lawal - Laboratory Attendant
8. Mr. O. Morebise - Laboratory Attendant
9. Mr. W. A. Adomagbor - Laboratory Attendant

### **REGISTRY STAFF**

1. Mrs. F. A. Arisoyin - Asst. Chief Data Mgt. Officer
2. Mrs. D. O. Akanni - Typist I
3. Mrs. E. A. Atanda - Office Assistant

## **(B) DEPARTMENT OF BIOCHEMISTRY**

### **ACADEMIC STAFF**

1. Prof. A. A. Adesokan - MBBS, MSc, PhD (Professor)
2. Dr. A. Adetutu - BTech, MTech, PhD (Senior Lecturer)
3. Dr. A. S. Adekunle - BSc, MSc, PhD (Senior Lecturer)
4. Dr. O. T. Adedosu - BSc, MSc, PhD (Snr. Lect/Ag Head)
5. Dr. A. L. Adedeji - BSc, MSc, PhD (Senior Lecturer)
6. Dr. O. L. Ehigie - BSc, MSc, PhD (Senior Lecturer)
7. Dr. O. K. Afolabi - BTech, MSc PhD (Lecturer I)
8. Dr. O. S. Olorunnisola - BSc, MSc, PhD (Lecturer I)
9. Dr. E. B. Oyewo - BSc, MSc PhD (Lecturer I)
10. Mr. A. O. Owoade - BSc, MSc (Lecturer I)
11. Mr. L. W. B. Olaniyan - BSc, MSc (Lecturer I)
12. Mr. B. M. Olabinrin - BSc, MSc (Lecturer I)
13. Mr. J. A. Adebisi - BSc, MSc (Lecturer I)
14. Mr. J. Badmus - BSc, MSc (Lecturer I)
15. Mr. G Adeleke - BSc, MSc (Lecturer II)
16. Mrs. A. F. Ehigie - BSc, MSc (Lecturer I)
17. Mr. J. O. Fatoki - BSc, MSc (Assistant Lecturer)
18. Mr. I. T. Adelusi - BSc M.Sc (Assistant Lecturer)
19. Dr. O. A. Akinloye - BSc, MSc, PhD (Asso. Lect./Reader)

### **TECHNICAL STAFF**

1. Mr. O. J. Fakunle - Chief Technologist
2. Miss O. Q. Owolabi - Senior Technologist
3. Mr. R. A. Ajani - Senior Technologist
4. Mrs. C. O. Ayanwola - Technologist II
5. Mr. G I. Lawal - Senior Laboratory Assistant
6. Mrs. C. B. Olatunji - Supervisor

### **REGISTRY STAFF**

1. Mrs. M. A. Makinde - Snr. Confidential Secretary
2. Mrs. D. A. Sorinade - Typist I
3. Mrs. R. O. Ademola - Head Office Assistant

### **(C) DEPT. OF CHEMICAL PATHOLOGY**

#### **ACADEMIC STAFF**

1. Prof. T. A. Adewole - BSc, MBBS, PhD, FMCPATH (Prof.)
2. Dr. D. P. Oparinde - MBBS, FWACP (Lab Med) (Reader)
3. Dr. P. S. Ogunro - MD, MSc, FMCPATH, FWACP  
(Lab Med) (Reader)
4. Dr. A. A. Salawu - MBBS, FMCPATH (Lecturer I)
5. Dr. O. G. Ayelagbe - BSc, MSc, PhD (Snr. Lect.) Ag. Head
6. Mrs. A. A. Iyanda - BSc, MSc PhD (Lecturer I)
7. Mrs. M. B. Ajadi - BSc, MSc. (Assistant Lecturer)

#### **TECHNICAL STAFF**

1. Mr. T. O. Adebayo - Asst Chief Med. Lab. Technologist
2. Mrs. M. Morgan - Principal Laboratory Technologist
3. Mr. O. A. Lawal - Laboratory Attendant

#### **REGISTRY STAFF**

1. Mrs. T. K. Odesola - Senior Data Mgt. Officer
2. Mrs. R. A. Oguntola - Senior Office Assistant

### **(D) DEPARTMENT OF HAEMATOLOGY**

#### **ACADEMIC STAFF**

1. Dr. V. O. Mabayoje - MBBS, FWACP Lab Med  
(Reader)
2. Dr. A. A. Akinpelu - MBBS, FMCPATH (Lecturer I)  
Ag Head

#### **TECHNICAL STAFF**

1. Mr. J. O. Olaifa - Assistant Chief Technologist
2. Mr. D. O. Awe - Technologist I
3. Mrs. F. I. Adeoye - Laboratory Attendant
4. Miss G. O. Ajiboye - Laboratory Attendant

#### **REGISTRY STAFF**

1. Mrs. O. M. Adebiyi - Typist I
2. Mrs. F. F. Fakunle - Office Assistant

**(E) DEPT. OF MEDICAL LABORATORY SCIENCES****ACADEMIC STAFF**

1. Dr. A. O. T. Alli - BSc, MSc, PhD (Reader)
2. Dr. E. O. Akanni - AMLSCN, PGD, MTech, PhD (Snr. Lect)  
Ag. HOD
3. Dr. D. O. Ogbolu - AMLSCN, FMLSCN, MSc, PhD (Snr.Lect)
4. Dr. C. Igbeneghu - BMLS, MSc, PhD (Senior Lecturer)
5. Dr. S. A. Nassar - BSc, MSc, PhD (Lecturer I)
6. Mr. B. S. A. Oseni - AMLSCN, PGD, MSc (Lecturer I)
7. Mr. B. M. Okanlawon - BSc, MSc (Lecturer I)
8. Mr F. F. Akinola - AMLSCN, MSc (Lecturer I)

**TECHNICAL STAFF**

1. Mr. O. O. Adegoke - Principal Laboratory Technologist
2. Mr. O. A. Olaolu - Asst. Chief Med. Lab. Scientist
3. Mr. J. A. T. Olaniyan - Medical Laboratory Scientist I
4. Mr. T. T. Alabi - Principal Med. Lab. Scientist
5. Mr. A. A. Adesiyian - Principal Med. Lab. Scientist
6. Mrs. O. R. Folarin - Medical Laboratory Scientist I
7. Mrs. T. A. Niran-Atiba - Snr. Med. Laboratory Scientist
8. Mr. M. A. Oyenike - Snr. Med. Laboratory Scientist
9. Mr. S. A. Oluremi - Medical Laboratory Scientist I

**REGISTRY STAFF**

1. Mrs. M. M. Adeleye - Principal Confidential Secretary
2. Mr. O. R. Makinde - Higher Executive Officer

**(F) DEPT. OF MEDICAL MICROBIOLOGY & PARASITOLOGY****ACADEMIC STAFF**

1. Prof. O. A. Adeyeba - AIMLT, MSc, MPhil, PhD
2. Prof. S. S. Taiwo - MBBS, FMCPATH
3. Dr. O. A. Olowe - BSc, MSc, PhD
4. Dr. D. O. Ojurongbe - BSc, MSc, PhD (Reader/Ag. Head)
5. Dr. O. O. Opaleye - DVM, MSc, PhD (Senior Lecturer)
6. Dr (Mrs) O. Y. Adesiji - DVM, MSc, PhD (Senior Lecturer)
7. Dr. O. S. Bolaji - AIMLT, PGD, MSc, PhD (Lecturer I)
8. Mrs. O. C. Adekunle - BSc, MSc (Lecturer I)

**TECHNICAL STAFF**

1. Mrs. A. A. Adegoke - Chief Med. Lab. Scientist
2. Mrs. M. A. Adekanle - Asst Chief Med Lab Technologist
3. Mr. O. A. Adefioye - Asst. Chief Med. Lab. Scientist
4. Mrs. O. J. Idris - Senior Laboratory Technologist
5. Mrs. R. A. Akanni - Senior Laboratory Technologist
6. Mr. S. O. Adeleke - Senior Laboratory Assistant
7. Mr. G G. Odunyemi - Laboratory Attendant

**REGISTRY STAFF**

1. Mr. E. M. Tinuoye - Snr. Data Mgt. Officer
2. Mr. R. W. Oyetade - Office Assistant

**(G) DEPARTMENT OF MORBID ANATOMY & HISTOPATHOLOGY**

**ACADEMIC STAFF**

1. Dr. D. Sabageh - MBBS, FMCPATH  
(Senior Lecturer/Ag Head)
2. Prof. A. S. Anjorin - MBBS, FRCP, FMCPATH, FWACP  
(Contract Prof)
3. Prof. E. A. O. Afolayan - MBBS, FMCPATH  
(Associate Lecturer/Professor)
4. Prof. M. O. Buhari - MBBS, FWACP (Lab Med)  
Associate Lecturer/Prof

**TECHNICAL STAFF**

1. Mr. W. A. Fabiyi - Snr Med. Lab. Scientist
2. Mr. O. A. Omotosho - Snr Med. Lab. Technician

**REGISTRY STAFF**

1. Mrs. A. O. Akande - Senior Typist
2. Mrs. A. O. Owolabi - Head Office Assistant

**(H) DEPT OF PHARMACOLOGY & THERAPEUTICS**

**ACADEMIC STAFF**

1. Dr. E. O. Awe - DVM, MSc, PhD (Reader)
2. Mr. O. K. Wakeel - BSc, MSc (Lecturer I)
3. Mr. O. T. Kolawole - BSc, MSc (Lect. I/Ag. Head)
4. Dr. A. A. Ayankunle - MBBS, MSc (Lecturer I)
5. Dr. O. J. Onaolapo - MBBS, MSc (Lecturer II)
6. Prof. O. G. Ademowo - BSc, MSc, PhD  
(Associate Lecturer/Prof)
7. Dr. S. O. Olayemi - MBBS, MSc, PhD  
(Associate Lecturer/Reader)

**TECHNICAL STAFF**

1. Mr. I. O. Olaniran - Asst. Chief Technologist
2. Mr. W. I. Omolaoye - Principal Technologist
3. Mrs. F. B. Azeez - Technologist II
4. Mr Olaosebikan - Laboratory Attendant
5. Miss K. M. Adebiyi - Animal House Assistant
6. Mrs. J. A. Ojeyinka - Animal House Assistant
7. Mr. A. O. Ayileka - Laboratory Assistant
8. Mrs. R. O. Olaosun - Laboratory Assistant
9. Miss A. O. Lawal - Laboratory Assistant
10. Miss F. F. Omosebi - Laboratory Assistant

**REGISTRY STAFF**

1. Mrs. J. A. Adewuyi - Conf. Secretary II
2. Miss O. M. Olonade - Senior Office Assistant

## **(I) DEPARTMENT OF PHYSIOLOGY**

### **ACADEMIC STAFF**

1. Dr. A. M. Adesola - BSc, MSc, PhD  
(Senior Lecturer)
2. Dr. A. S. Oyadeyi - BSc, MSc, PhD (Lect. I)  
Ag. Head
3. Dr. A. F. Ajayi - DVM, MTech. PhD (Lect I)
4. Dr. A. O. Afolabi - MBBS, MSc. (Lecturer I)
5. Mr. U. S. Udoh - BSc, MSc. (Lecturer I)
6. Mrs. F. O. Ajao - BSc, MSc. (Lecturer I)
7. Mrs. S. F. Ige - BSc, MSc. (Lecturer I)
8. Dr. W. A. Saka - MBBS, MSc. (Lect. II)
9. Mr. O. A. Oyekunle - BSc, MSc. (Lecturer II)
10. Dr. O. S. Oyekunle - MBBS. MSc. (Asst. Lect)
11. Dr. O. O. Ogundipe - MBBS (Asst. Lecturer)
12. Mr. G O. Owolabi - BSc, MSc. (Asst. Lect.)
13. Prof. V. A. Togun - BSc, MSc. PhD  
(Asso. Lecturer/Professor)

### **TECHNICAL STAFF**

1. Mr. O. O. Olayinka - Senior Technologist
2. Mr. O. A. Adeleye - Senior Technologist
3. Mr. M. T. Lamidi - Senior Technologist
4. Mrs C. O. Oyeboade - Technologist I
5. Mr T. O. Oyaniyi - Technologist I
6. Mr. J. O. Okesanya - Technologist II
7. Mrs. G. O. Olaoye - Technologist II
8. Mr. M. S. Alao - Technologist II
9. Mrs. G. Dairo - Laboratory Assistant
10. Mr. T. K. Adewemimo - Animal House Attendant
11. Mrs. M. Olaniyan - Laboratory Attendant

### **REGISTRY STAFF**

1. Mrs. B. T. Azeez - Principal Data Management Officer
2. Mrs. A. B. Sona - Senior Typist
3. Mrs. O. M. Olahan - Snr Office Assistant

## **1. DEPARTMENT OF ANATOMY**

### **(A) MBBS PROGRAMME**

#### **A. REQUIREMENT**

All MBBS Students must undertake Lectures and practical in Gross Anatomy, Histology Embryology and Neuroanatomy as part of their training towards meeting the requirements for the award of the MBBS degree. Lectures are scheduled along with the practical sessions.

#### **1. Structure of Tests and Examinations**

- i. 200 Level Students shall normally complete lectures and in-course progressive (continuous) assessment tests in Lower Limb; Upper Limb; Thorax; General Embryology and Genetics as well as General histology
- ii. 300 Level Students shall normally complete lectures and in-course progressive (Continuous) Assessment tests in Abdomen; Systemic Embryology and Histology; Head and Neck and Neuroanatomy before they take the Part I Professional MBBS Anatomy examinations. However, questions for this examination will be drawn from the course contents of both 200 Level and 300'Level classes.
- iii. The Part I MBSS examination shall be in four parts viz: Paper 1 MCQs and Paper II (Essay): Practicals (Steeplechase or Onward Anatomy) as well as the Oral Examination (viva voce)
- iv. The question pattern shall be as follows:

#### **300 level Part I MBBS Examination**

- a. MCQ: - 100 Multiple Choice Question (MCQs) of the true or false pattern, each with a leading statement followed by five (A, B, C, D, E) options drawn from all areas taught from beginning of 200L to end of 300L lecture periods (as above) distribution as follows: Upper Limbs (5), Lower Limbs 5),

Thorax (10), Abdomen (12), Pelvis (8), Perineum (6), Head (7), Neuroanatomy (10), General Histology (5), General Embryology (5), Systemic histology (100, Systemic Embryology (10), taken over a duration of 2 hours 30 minutes.

- b. Essay Paper of the Part 1 MBBS Examination shall consist of five (5) questions distributed into 4 sections (A - D) as follows and taken over duration of 3 hours.

|  |             |
|--|-------------|
| Section A(Upper and Lower Limbs)                 | - 20 marks  |
| - Section B (Thorax, Abdomen, Pelvis & Perineum) | - 30 marks  |
| - Section C (Head, Neck and Neuroanatomy)        | - 30 marks  |
| Section D (Histology and Embryology)             | - 20 marks  |
| - Total  | - 100 marks |

The marks obtainable from each question will normally be indicated against each question.

- c. Practical Examination of the Part 1 MBBS Anatomy shall consist of 10 Histology slides mounted on the stages of light microscopes with questions placed beside each microscope for the candidates to observe and answer the questions; 5 photomicrographs of Histology and/or Photo-macrographs of embryology specimens, 35 gross anatomy specimens made up of bones, prospected body parts, visceral organs, dissected body parts as well as museum specimens in preservation pots, displayed in order and numbered accordingly. Questions asked on each specimen may have 2 parts each allotted half of a mark. A total of 50 marks could be obtained, one mark for each specimen. Time allowed for each Practical question will be 40 seconds.

- d. Oral (Viva voce) component of the Part I MBBS examination shall comprise questions asked by the External Examiner on topics across all areas in Anatomy. Students -are usually required to demonstrate their understanding of Anatomy by identifying various structures from among the numerous practical specimens usually made available. Identification of

microscopic specimens could be required by the External Examiner to test the candidate's practical knowledge of histology. A total of 50 marks are obtainable.

The final score obtainable by any candidate could be calculated as follows:

|                                      |       |
|--------------------------------------|-------|
| Continuous Assessment                | - 25% |
| Attendance at Lectures and Practical | - 5%  |
| Total Pre-exam Score                 | - 30% |

Total Examination score obtainable is as follows:

|                             |             |
|-----------------------------|-------------|
| - MCQ Score                 | - 100 marks |
| - Total Essay Score         | - 100 marks |
| - Total Steeple chase Score | - 50 marks  |
| - Viva voce                 | - 50 marks  |
| Total Examination Score     | -300 marks  |

(converted to 70%)

MBBS Part I Examination scores (Pre-exam + Exam score) = 100%

## **2. Eligibility for Department Tests and Examinations**

All students who have been confirmed by the Faculty College as bona fide MBBS students are eligible to sit for all in-course assessment tests organized by the Department for the class he / she belongs. However, only those arrive at the venue not later than two-fifth (2/5) of the overall time allotted for that - examination will be allowed to sit for such test or exam. More so, students may be required to show their identity cards before being allowed into the test or examination venue.

Only students who have satisfied 45% mark for all continuous assessment tests as well as 75% attendance will be allowed to sit for the 200L comprehensive examination and / or Part 1 MBBS examination for 300L students as contained in the College Regulations.

## **3. Conduct at Tests or Examinations**

All LAUTECH regulations on candidates conduct -at examinations also apply to the Departmental test/examinations. The department

could however decide on additional penalty for misconduct at examinations/tests organized by it.

## **4. Absenteeism**

Notices for tests shall be duly put up at least two weeks to the date fixed for such test. All students who therefore absent themselves from any of such tests will not have another opportunity to re-take. Those with medical reports duly certified by LAUTECH Health Centre could however have their cases reviewed by the Department and each case shall be treated according to its own peculiarity and merit for a reprieve which will not include a re-lake option. In summary, make-up (re-take) tests are not possible in this Department for ALL categories of students.

Cases of absenteeism from comprehensive examination or Part I MBBS examination are the concern of the Faculty or College.

## **5. Grading of student scripts**

Results of all examinations, or tests taken shall be released with the total obtainable marks specified to enable students know their relative standing per time. In most cases, marks allotted each question shall be indicated against each question on the question paper to enable the candidate select (or plan for) which approach or combination will be more rewarding.

Most multiple choice questions (MCQs) are graded with a penalty factor of "one-half" which means that half of the total number of failed answers will be deducted from the total number of correct answers. This is adopted to discourage guessing and encourage honesty and precision whereby students answer only those MCQs which they are sure of their correctness.

Essay, Practical and Oral questions will however not be graded with any penalty. The total of all Continuous Assessment Test scores shall be compressed to make up 25% while attendance at lectures and practical classes shall carry a complementary mark of 5% to make up the 30% mark required for continuous assessment. The final

examinations (Comprehensive and Part 1 MBBS) will be based on 70% as earlier indicated.

## 6. Release of results

Results of all in-course tests taken in the Department shall be released within 2 weeks after the date of the test. However the release of results of the final examinations is to be centrally done by the Faculty and so students are not expected to request for such results from the department

All unreleased test results shall be released after due complaint has been made to the Head of Department or /and Examinations Officer or any other officer assigned by the HOD.

## B. COURSE CONTENT

### BASIC ANATOMY

- The Subject: Anatomy
- The place of Anatomy in Medicine
- Methods of the study of Anatomy
- Application of Basic Anatomy to Clinical Medicine
- Vertebrates and man
- Anatomy of the cell and cellular function
- Classification of joints
- Bone and Radiological Anatomy
- Dentition
- The Nervous System Muscles
- Glandular Tissues

### EMBRYOLOGY

- General embryology
- The importance of Embryology to Medicine
- Sub-division of Embryology
- Origin of Germ Cells
- Spermatogenesis and Oogenesis

- Sex determination
- Events leading to Fertilization
- Oestrus and Menstruation
- Ovarian Cycle and Ovulation
- Fertilization, Cleavage and Gastrulation
- The origin of Germ layers
- Derivatives of the germ layers
- Mechanisms of Morphogenesis
- Foetal Membranes
- Classification of the Placenta
- Growth
- Estimation of Embryonic age
- Differentiation
- Introduction to experimental Embryology

### *Systemic Embryology*

- Development of Spleen
- The Haemopoietic System
- Development of the Kidneys
- Development of the Gonads, the Uterus and the Prostate
- Development of the external Genitalia
- Descent of the Testes
- Abnormalities of the Urogenital System
- Development of the Vertebral Column and the Skull
- The Neural Tube
- Histogenesis of the Nervous System
- The Neural Crest
- The Hypophysis
- The eye, Olfactory tract and the Statoacoustic apparatus
- The Brain
- The Spinal Cord and Peripheral nerves
- Development of the Skull, Teeth, Face, Mouth, Nose and the Palate
- Mechanism of development of the nervous system:  
Experimental methods
- Congenital; Malformations: (Summary Lecture)

GENETICS

- Mechanism of inheritance: Mendel's Laws
  - Significance of Oogenesis and Spermatogenesis in Man
  - Sex linkage
  - Effects of Radiation and In-breeding in man
  - Genes in development and differentiation; causes of abnormal developments;
  - Sex ration, twining, Congenital malformations
  - Nature of genes
  - Genetic control of inherited diseases; genetic counseling

MICROSCOPIC ANATOMY

## General histology

- Cell structure and division
  - Epithelia tissues
  - Connective tissues
  - Bone and Cartilages
  - Muscular Tissues
  - Nervous Tissues I
  - Nervous tissues II

## Systemic histology

- Histology of musculoskeletal and integumentary Systems
  - Circulatory (Blood Vascular) System
  - Lymphatic (Lymphoid Organs)
  - Digestive System I
  - Digestive System II
  - Glands of the Digestive System
  - Respiratory System
  - Urinary System
  - Male reproductive System
  - Female reproductive system
  - Endocrine system I
  - Endocrine system II
  - Eye
  - Ear

## GROSS ANATOMY

- Lectures on the Gross Anatomy of the Lower Limb with emphasis on clinical application
  - Lectures on the Gross Anatomy of Upper Limb and Thorax with emphasis on Clinical application
  - Lectures on the Gross Anatomy the Abdomen, Pelvis and Perineum with emphasis on the clinical application

NEUROANATOMY

## **(B) BACHELOR OF TECHNOLOGY DEGREE PROGRAMME**

### **INTRODUCTION**

The department of Anatomy came into existence in 1990 as one of the three foundation departments in the Faculty of Basic Medical Sciences, College of Health Sciences. Since its inception, the Department has been involved, primarily, in the teaching of Anatomy to Medical Students.

### **PHILOSOPHY AND OBJECTIVES:**

The Bachelor of Technology Programme in Human Anatomy is designed to provide intensive training in Human Anatomy, and relevant aspects of related disciplines in Health Sciences such as Physiology, Biochemistry, Radiology, Surgery and Social Sciences. Teaching will be clinically oriented to ensure that the products of the programme will be able to serve as anatomy lecturers in various medical institutions. Graduates of the programme will also be well equipped with sufficient theoretical and practical knowledge and thus be eligible for higher degree studies in an aspect of anatomy.

### **ENTRY REQUIREMENTS:**

- (i) Candidates seeking admission through UME must have credits in the SSCE/NECO examination in English Language, Mathematics, Biology, Chemistry and Physics at not more than two sittings.
- (ii) Candidates with acceptable performance in each of the Pre-Degree Science subjects shall normally be considered for admission to the programme. In addition to success in Pre-Degree programme, the candidates must also satisfy the basic requirement of credit passes in English Language, Mathematics, Chemistry, Biology and Physics.
- (iii) For Direct Entry, candidates must possess 'A' level passes in Biology, Chemistry and either Mathematics or Physics. Holders of the National Diploma (with Upper Credit), Higher National Diploma (with Lower Credit) or University Degrees in relevant disciplines will also be eligible for admission through Direct Entry. They should, however, possess the minimum SSCE/NECO entry requirements.

### **REQUIREMENTS FOR THE AWARD OF B.TECH ANATOMY:**

In order to be eligible for the B.Tech. Degree in Anatomy, a candidate must pass all the compulsory courses as well as the prescribed number of required and elective courses.

### **FORMATS FOR EXAMINATION:**

The examination shall be in four parts for each level

1. Continuous assessment of theoretical knowledge (MCQs and /or Essay type questions).
2. Continuous assessment of practical knowledge (steeplechase and/or viva voce). End of semester written examination (MCQs and/ or Essay type questions). End of semester practical examination.

### **CLASSIFICATION OF DEGREE**

- (a) The cumulative grade point average (CGPA) shall be used for determination of the class of degree.
- (b) (i) The Grade to be used for students who satisfactorily complete the requirements of a course at the end of the semester are:

| <b>Letter Grade</b> | <b>Grade Point</b> | <b>Mark (%)</b> |
|---------------------|--------------------|-----------------|
| A                   | 5                  | 70 and above    |
| B                   | 4                  | 60 - 69         |
| C                   | 3                  | 50 - 59         |
| D                   | 2                  | 45 - 49         |
| E                   | 1                  | 40 - 44         |
| F                   | 0                  | Below 40        |

- (ii) The class of the degree of a student who satisfactorily completes his/her course of studies shall be determined as follows:

| <i>Class of Degree</i>                       | <i>CGPA</i>    |
|--|----------------|
| (i) First Class                              | 4.50 - 5.00    |
| (ii) Second Class ( <i>Upper Division</i> )  | 3.50 - 4.49    |
| (iii) Second Class ( <i>Lower Division</i> ) | 2.40 - 3.49    |
| (iv) Third Class                             | 1.50 - 2.39    |
| (v) Pass                                     | 1.00 - 1.49    |
| (vi) Fail                                    | Less than 1.00 |

- c. (i) In order to obtain the C.G.P.A of a candidate, the grade points assigned to each letter grade are multiplied by the course units and the products added up to give the total weighted grade points. The 4 total number obtained is then divided by the total of course units taken (passed or failed to obtain the C.G.P.A),  
(ii) The obtained C.G.P.A shall be expressed correct to two decimal places.

#### COURSE CODE:

All anatomy departmental courses shall be represented by a course code made up of a three (3) letter component (ANA) followed by three numbers. The first number represents the year or level of study; the second number is variable and represents the order the course appears for that semester while the last number will either be 1 or 2, representing first and second semesters respectively.

#### COURSE OUTLINE 100 LEVEL HARMATTAN SEMESTER

| Course code  | Course Title             | Compulsory Required (R)<br>Elective E | Hours L.T.P. | Units     |
|--------------|--------------------------|---------------------------------------|--------------|-----------|
| BIO 101      | General Biology I        | C                                     | 2.1.0        | 3         |
| BIO 103      | Experimental Biology I   | C                                     | 0.0.3        | 1         |
| CHM 101      | Introductory Chemistry   | C                                     | 3.1.0        | 4         |
| CHM 191      | Experimental Chemistry I | C                                     | 0.0.3        | 1         |
| PHY 101      | Experimental Physics     | C                                     | 3.1.0        | 4         |
| PHY 103      | General Physics          | C                                     | 0.0.3        | 1         |
| MTH 101      | Elementary Mathematics   | C                                     | 4.1.0        | 5         |
| GNS 101      | Use of English I         | C                                     | 2.0.0        | 2         |
| FAA 101      | Fundamentals of Drawing  | C                                     | 1.0.0        | 1         |
| LIB 101      | Use of Library           | C                                     | 1.0.0        | 1         |
| <b>Total</b> |                          |                                       |              | <b>24</b> |

**100 LEVEL RAIN SEMESTER**

| Course code | Course Title             | Compulsory Required (R)<br>Elective (E) | Hours L.T.P. | Units     |
|-------------|--------------------------|---|--------------|-----------|
| BIO 102     | General Biology I        | C                                       | 2.1.0        | 3         |
| BIO 104     | Experimental Biology I   | C                                       | 0.0.3        | 1         |
| CHM 102     | Introductory Chemistry I | C                                       | 3.1.0        | 4         |
| CHM 191     | Experimental Chemistry I | C                                       | 0.0.3        | 1         |
| PHY 101     | Experimental Physics     | C                                       | 3.1.0        | 4         |
| PHY 103     | General Physics          | C                                       | 0.0.3        | 1         |
| MTH 101     | Elementary Mathematics   | C                                       | 4.1.0        | 5         |
| GNS 101     | Use of English I         | C                                       | 2.0.0        | 2         |
| FAA 101     | Fundamentals of Drawing  | C                                       | 2.0.0        | 1         |
| LIB 101     | Use of Library           | C                                       | 1.0.0        | 1         |
|             | <b>Total</b>             |   |              | <b>24</b> |

**100 LEVEL RAIN SEMESTER**

| Course code | Course Title             | Compulsory Required (R)<br>Elective (E) | Hours L.T.P. | Units     |
|-------------|--------------------------|---|--------------|-----------|
| BIO 102     | General Biology I        | C                                       | 2.1.0        | 3         |
| BIO 104     | Experimental Biology I   | C                                       | 0.0.3        | 1         |
| CHM 102     | Introductory Chemistry I | C                                       | 3.1.0        | 4         |
| CHM 192     | Experimental Chemistry I | C                                       | 0.0.3        | 1         |
| PHY 102     | Experimental Physics     | C                                       | 3.1.0        | 4         |
| PHY 104     | General Physics          | C                                       | 0.0.3        | 1         |
| MTH 102     | Elementary Mathematics   | C                                       | 4.1.0        | 5         |
| GNS 102     | Use of English I         | C                                       | 2.0.0        | 2         |
| FAA 110     | Fundamentals of Drawing  | C                                       | 2.0.0        | 1         |
| LIB 100     | Use of Library           | C                                       | 1.0.0        | 1         |
|             | <b>Total</b>             |   |              | <b>24</b> |

## 200 LEVEL RAIN SEMESTER

| Course code  | Course Title   | Compulsory Required (R)<br>Elective (E) | Hours L.T.P. | Units     |
|--------------|--|---|--------------|-----------|
| ANA 201      | Gross Anatomy of<br>(Upper Limb)                                       | C                                       | 2.0.3        | 3         |
| ANA 211      | Histology of the<br>Respiratory System                                 | C                                       | 2.0.3        | 2         |
| ANA 222      | Histology of the GIT &<br>Associated Structures I                      | C                                       | 2.0.3        | 2         |
| ANA 232      | Development of the<br>Respiratory & Digestive<br>Systems& BodyCavities | C                                       | 2.1.0        | 3         |
| PHY 242      | Evolution & Paleobiology   | R                                       | 2.0.0        | 2         |
| PHY 104      | General Physics  | C                                       | 0.0.3        | 1         |
| MTH 102      | Elementary Mathematics   | C                                       | 4.1.0        | 5         |
| GNS 102      | Use of English I   | C                                       | 2.0.0        | 2         |
| FAA 110      | Fundamentals of Drawing  | C                                       | 2.0.0        | 1         |
| LIB 100      | Use of Library   | C                                       | 1.0.0        | 1         |
| <b>Total</b> |  |   |              | <b>24</b> |

## 200 LEVEL HARMATTAN SEMESTER

| Course code  | Course Title                                    | Compulsory Required (R)<br>Elective (E) | Hours L.T.P.  | Units     |
|--------------|---|---|---------------|-----------|
| ANA 201      | Introduction to Anatomy<br>of Body Systems      | C                                       | 1.0.0         | 1         |
| ANA 211      | Gross Anatomy of<br>Lower Limb I                | C                                       | 2.0.3         | 3         |
| ANA 221      | General Histology                               | C                                       | 1 0 3         | 2         |
| ANA 231      | General Embryology                              | C                                       | 2 0 0         | 2         |
| ANA 241      | Introduction to Genetics                        | C                                       | 2 0 0         | 2         |
| ANA 251      | History of Anatomy &<br>Philosophy of Bio Scie. | C                                       | 1 0 0         | 1         |
| GNS 201      | Culture and Specializa-<br>tion patterns        |   | 2 0 0         | 2         |
| GNS 209      | Elements of Admin.                              |   | 2 0 0         | 2         |
| PSG 201      | General Principles of<br>Physiology             |   | 2 0 0         | 2         |
| BCH 201      | Structure and Chemistry<br>of Biomolecules      |   | 3 0 0         | 3         |
| CSE 201      | Computer Programming                            |   | 1 0 2         | 2         |
| FAA 201      | Basic Drawing I                                 |   | 1 0 2         | 2         |
| <b>TOTAL</b> |   |   | <b>18 0 6</b> | <b>24</b> |

## 200 LEVEL RAIN SEMESTER

| Course code  | Course Title   | Hours L.T.P.  | Units     |
|--------------|--|---------------|-----------|
| ANA 202      | Gross Anatomy of Upper Limb                              | 2 0 3         | 3         |
| ANA 212      | Histology of Musculoskeletal and Integumentary Systems I | 2 0 0         | 3         |
| ANA 222      | Development of Musculoskeletal & Integumentary Systems   | 2 0 0         | 2         |
| ANA 232      | Evolution and Paleobiology                               | 2 0 0         | 2         |
| PSG 352      | Gastrointestinal Physiology                              | 2 0 0         | 2         |
| ANA 242      | Cell and Molecular Biology                               | 2 0 0         | 2         |
| BCH 220      | Practical Biochemistry                                   | 0 0 3         | 1         |
| <b>TOTAL</b> |  | <b>12 0 9</b> | <b>16</b> |

## 300 LEVEL HARMATTAN SEMESTER

| Course code  | Course Title  | Hours L.T.P.  | Units    |
|--------------|---|---------------|----------|
| NA 301       | Gross Anatomy of Thorax Abdomen                                     | 3 0 3         | 4        |
| ANA 311      | Histology of blood, the Cardiovascular & Lymphoid systems           | 1 0 3         | 3        |
| ANA 321      | Histology of respiratory System, GIT & Associated structures        | 2 0 3         | 3        |
| ANA 331      | Development of the CVS & Lymphoid Systems                           | 1 0 0         | 1        |
| ANA 341      | Development of the Respiratory and Digestive Systems & Body Cavity. | 3 0 0         | 3,       |
| PSG 331      | Renal Physiology  | 1 0 0         | 1        |
| PSG 341      | Respiratory Physiology  | 1 0 0         | 2        |
| PHM 301      | Introduction to Pharmacology  | 2 0 0         | 3        |
| BCH 301      | Metabolism of Protein & Amino acids                                 | 2 1 0         | 3        |
| <b>TOTAL</b> |   | <b>16 1 9</b> | <b>3</b> |

## 300 LEVEL RAIN SEMESTER

| Course code  | Course Title                               | Hours L.T.P.  | Units     |
|--------------|--|---------------|-----------|
| ANA 302      | Gross Anatomy of Thorax, Pelvis & Perineum | 2 0 3         | 3.        |
| ANA 312      | Urogenital System Histology                | 1 0 3         | 2         |
| ANA 322      | Endocrine System Histology                 | 1 0 3         | 2         |
| ANA 332      | Development of the Head and Neck           | 2 0 0         | 2         |
| ANA 342      | Dev. of the Urogenital System              | 2 0 0         | 2         |
| BCH 306      | Enzymes                                    | 1 0 0         | 1         |
| PSG 322      | Cardiovascular Physiology                  | 1 0 3         | 2         |
| PSG 202      | General principles of Endocrinology        | 2 0 0         | 2         |
| PSG 362      | Reproductive Physiology                    | 1 0 0         | 1         |
| <b>TOTAL</b> |  | <b>13 0 3</b> | <b>17</b> |

#### 400 LEVEL RAIN SEMESTER

| Course code  | Course Title   | Hours L.T.P. | Units     |
|--------------|--|--------------|-----------|
| ANA 401      | Neuroanatomy, CNS, & PNS                             | 2 0 3        | 3         |
| ANA 411      | Histology of the Nervous System, Eye and Ear         | 2 0 3        | 3         |
| ANA 421      | Histochemistry and Cytochemistry                     | 2 0 3        | 3         |
| BCH 401      | Neuro (bio) Chemistry                                | 2 0 0        | 2         |
| ANA 431      | Development of the nervous System, Ear and Eye       | 2 0 0        | 2         |
| ANA 441      | Gross Anatomy of Head and Neck                       | 2 0 3        | 3         |
| ANA 451      | Radiological Anatomy, Applied and Clinical Anatomy ! | 1 0 3        | 2         |
| ANA 473      | Autonomic Nervous System                             | 1 0 0        | 1         |
| ANA 461      | Applied Biomechanics, Physiotherapy and Biomedical I | 1 0 1        | 2         |
| PSG 401      | Functional Neuroanatomy (Neurophysiology)            | 1 0 0        | 1         |
| BST 401      | Biostatistics  | 2 0 0        | 2         |
| <b>TOTAL</b> |  | <b>18</b>    | <b>23</b> |

#### 400 LEVEL RAIN SEMESTER

CLINICAL INTERNSHIP OR LABORATORY ATTACHMENT (SIWES PROGRAMME) (eligible 400 level students will go for clinical internship or laboratory attachment during the rain semester)

#### 500 LEVEL HARMATTAN SEMESTER

| Course code  | Course Title                           | Hours L.T.P. | Units     |
|--------------|--|--------------|-----------|
| ANA 501      | Comparative Anatomy                    | 1 1 0        | 2         |
| ANA 511      | Developmental Reproductive and Anatomy | 2 1 0        | 3         |
| ANA 521      | Surface Anatomy and Anthropometry      | 2 1 0        | 3         |
| ANA 531      | Experimental Research Methodology      | 2 0 3        | 3         |
| ANA 541      | Laboratory Techniques                  | 2 1 0        | 3         |
| <b>TOTAL</b> |  | <b>9 4 3</b> | <b>14</b> |

#### 500 LEVEL HARMATTAN SEMESTER

| Course code  | Course Title                       | Hours L.T.P.  | Units     |
|--------------|------------------------------------|---------------|-----------|
| ANA 502      | Conceptual Anatomy                 | 1 1 0         | 2         |
| ANA 512      | Physical and Forensic Anthropology | 1 1 0         | 2         |
| ANA 522      | Seminar                            | 0 0 9         | 3         |
| ANA          | Project                            | 0 0 8         | 6         |
| <b>TOTAL</b> |                                    | <b>2 2 17</b> | <b>13</b> |

**(2) DEPARTMENT OF BIOCHEMISTRY**

**(A) MBBS PROGRAMME**

**CURRICULUM & LECTURE SCHEDULE**

**200 LEVEL MBBS STUDENTS**

HARMATTAN SEMESTER

**Introductory Biochemistry**

Introduction to Biochemistry and its role in Medical Practice. Dissociation of water; acids and bases; pH and buffers; Henderson-Hasselbach equation; preparation of solutions. Stereochemistry. Other chemical concepts relevant to Biochemistry.

**Chemistry of Carbohydrates**

Introduction and classification of the carbohydrates; physical and chemical properties of monosaccharides, disaccharides and polysaccharides. Isomerism and epimerism of carbohydrates. Properties of reducing and non-reducing sugars.

**Chemistry of Lipids**

Lipids - introduction and classification; structures and functions of various lipids. Chemistry of saturated and unsaturated fatty acids. The role of saturated & unsaturated fatty acids in the biosynthesis of prostaglandins, thromboxanes etc; Blood lipids.

**Chemistry of Amino acids and Proteins**

Proteins and amino acids-General introduction; functional classification of protein; structures and the role of its functional groups. Linoc proteins and amino acids. Methods of separating amino acids and protein. Determination of amino acids sequence of proteins.

**Chemistry of nucleotides and nucleic acids**

Structure of DNA and RNA. DNA denaturation. A detailed study of the structure of the purine. Structures of pyrimidine nucleotides. Base pairing in DNA and the differences between DNA and RNA etc

**Enzymology, Vitamins and Coenzymes**

Introduction to enzyme Kinetics and the role of enzymes in the regulation of metabolism. A detailed study of vitamins and their role in metabolism and coenzyme function

RAIN SEMESTER

**METABOLISM OF BIOMOLECULES**

**Metabolism of Carbohydrates**

Digestion and Absorption of Carbohydrates; Glucose Utilization, Glycolysis, The Kreb's Cycle, Pentose Phosphate Pathway, Gluconeogenesis, Glycogenesis, Glycogenolysis and their Biochemical Importance. The Electron Transport Chain and Oxidative Phosphorylation. Control of Carbohydrate Metabolism. Diseases of Carbohydrate Metabolism

**Metabolism of Lipids**

Beta-Oxidation of Fatty Acids and other Minor Pathways of Fatty Acid Oxidation. Biosynthesis of Fatty Acids, Triacylglycerols and Phospholipids. Biosynthesis of Cholesterol, Transportation and Catabolism, Bile Acids and Bile Salts. Disorders of Lipid Metabolism and Control of Lipid Metabolism.

**Metabolism of Amino Acids and Proteins**

General metabolism of amino acids deamination, transamination, essential and non-essential amino acids. Protein catabolism, nitrogen balance; the urea cycle - its biochemical importance. Catabolism of the carbon skeletons of amino acids. Control of proteins and amino acid metabolism. Disorders of protein and amino acid metabolism. Conversion of amino acids into specialized products.

**Metabolism of Nucleic Acids**

Catabolism and biosynthesis of purine nucleotides. The salvage pathway. Biosynthesis and catabolism of pyrimidine. The salvage pathway. General control of nucleic acid metabolism. Disorders associated with nucleic acid metabolism.

**Mineral metabolism**

Regulation of water balance, normal and abnormal constituents of urine. Water and the major ions- H<sup>+</sup>, Na<sup>+</sup>, K<sup>+</sup>, HCO<sub>3</sub>, Cl etc. The importance and metabolism of calcium, phosphorus, iron and other trace mineral elements.

300 LEVEL MBBS STUDENTS

HARMATTAN SEMESTER

Special topics 1

**Biological fluids**

A detailed study of the blood-general properties, structure of normal and abnormal haemoglobin, blood clotting and other biological fluids such as CSF, plasma, etc.

**Nutritional Biochemistry**

Detailed study of nutrients, nutritional requirements. RDA, BMR, etc the role of nutrition in health and disease. A detailed study of the biochemical basis of nutritional disease

**Membrane Biochemistry and Endocrinology**

A detailed study of the cell membrane - structure, assembling and function. A brief outlook of membranes with specialized functions. General introduction, classification of hormones, molecular mechanism of hormonal action. A detailed study of the hormones of the pituitary, hypothalamus, and the gonads. A detailed study of the hormones of the adrenal cortex and medulla, the pancreas, etc. Deficiency diseases of the hormones and principles and methods of hormonal assay

**Molecular Biology**

DNA replication and translation. The genetic code and protein synthesis. Regulation of gene expression, the operon concept. Enzyme induction and repression. Genetic engineering, gene cloning and applications of recombinant DNA technology. The role of genetic engineering in modern medicine.

**IN-COURSE ASSESSMENT TEST****RAIN SEMESTER**

Special topics II

**Biochemistry of Tissues**

Biochemical functions of the kidney, renal function test. Biochemical functions of the liver, liver function tests, jaundice, Hepatitis, etc. Biochemistry of muscle action and the molecular basis of muscle dystrophy. Biochemistry of ageing and of diseases such as cancer, AIDS ETC. Neurodegenerative diseases.

**Immunology**

Molecular basis of immune reactions, Types, structure and functions of immunoglobulins. Antigen-antibody interactions, antigenic determinants. Laboratory methods and immunology. Application of immunotherapy.

**Xenobiochemistry**

A detailed study of metabolism of drugs and foreign compounds. Induction of microsomal enzymes and the principle of drug resistance.

**IN-COURSE ASSESSMENT TEST****Neurobiochemistry**

Introduction to neurobiochemistry: the neuron-structure, composition and metabolism. Neuro-hormonal regulatory mechanism, Metabolic antagonism in neurobiochemistry.

**Forensic Biochemistry**

Basic principles of forensic biochemistry. Recent advances in forensic biochemistry

**IN-COURSE ASSESSMENT TEST****PART I MBBS PROFESSIONALEXAMINATION**

**(B)            BACHELOR OF TECHNOLOGY  
              (B.TECH) PROGRAMMES**

**1.1 PHILOSOPHY OF THE PROGRAMME:**

The B. Tech (Biochemistry) degree programme is aimed at providing functional and practical training in the various areas of Biochemistry and Biotechnology with a view to producing self-reliant Biochemistry graduates who can contribute meaningfully to the technological and industrial development of Nigeria and the entire world.

**1.2 OBJECTIVES:**

The objectives of the program are:-

- (i) To provide basic and technical training in the various areas of Biochemistry and Biotechnology.
- (ii) To give the students the necessary orientation to enable them create jobs instead of being job seekers after the completion of their studies.
- (iii) To contribute to the industrial take-off in Nigeria by producing manpower in the area of Biotechnology.

**1.3 COURSE DURATION:**

The Degree Programme shall run for five years for joint Matriculation Examination entry candidates and four years for direct entry candidates.

**1.4 GENERAL REGULATION/ADMISSION REQUIREMENTS:**

- (i) Candidates seeking admission through UME must have credits in the SSCE/NECO examination in English Language, Mathematics, Biology, Chemistry and Physics at not more than two sittings .

- (ii) Candidates with acceptable performance in each of the Pre-Degree Science subjects shall normally be considered for admission to the programme. In addition to success in Pre-Degree programme, the candidates must also satisfy the basic requirement of credit passes in English Language, Mathematics, Chemistry, Biology and Physics .
- (iii) For Direct Entry, candidates must possess 'A' level passes in Biology, Chemistry and either Mathematics or Physics. Holders of the National Diploma (with Upper Credit), Higher National Diploma (with Lower Credit) or University Degrees in relevant disciplines will also be eligible for admission through Direct Entry. They should, however, posses the minimum SSCE/NECO entry requirements .

**1.5 INTER AND INTRA UNIVERSITY TRANSFER:**

The department may accept intra/inter university transfer under some factors:-

- (i) Senior Secondary School Certification with credit passes in English Lang, Mathematics, Biology, Chemistry and Physics.
- (ii) Relevant pass in the University Matriculation Examination (UME)
- (iii) Cumulative grade points (CGPA) not less than 3.0 on the scale of 5.

**1.6 REGISTRATION OF COURSES:**

At the beginning of each semester, the student must register for all the courses specified for the respective semester. No student can, however, register for more than 24 units per semester. Any student who fails to register three weeks to the examination would have no score in any for each of the courses in that semester. A student who fails to register for two consecutive semesters automatically loses his/ her studentship.

## **1.7 EXAMINATION:**

The assessment of performance in each of the courses will comprise of continuous assessment and an essay and/ or practical examinations. The overall pass mark for each course being assessed will be 40%. During the final year, a student will carry out a project that will be examined by an external examiner.

## **1.8 REQUIREMENT FOR PROCEEDING IN THE PROGRAMME**

A student who obtains a Cumulative Grade Point Average (CGPA) of 1.00 or more at the end of the session will be eligible to proceed to the next level of the programme. A student who obtains CGPA of less than 1.00 at the end of a semester will be on probation for the following semester to enable the students improve on the CGPA. A student on probation who obtains CGPA of less than 1.00 at the end of the following semester shall be required to withdraw from the programme.

*Performance in each course will be graded as follows:*

|               |   |   |   |               |
|---------------|---|---|---|---------------|
| 70 - 100%     | - | A | - | 5 grade point |
| 60 - 69%      | - | B | - | 4 grade point |
| 50 - 59%      | - | C | - | 3 grade point |
| 45 - 49%      | - | D | - | 2 grade point |
| 40 - 44%      | - | E | - | 1 grade point |
| Less than 40% | - | F | - | 0 grade point |

## **1.9 REQUIREMENT FOR THE AWARD OF A DEGREE**

In order to be eligible for the B. Tech. Degree in Biochemistry, a candidate must pass all the prescribed courses

|                       |   |          |
|-----------------------|---|----------|
| Basic Science Courses | - | 62 Units |
| General Studies       | - | 12 Units |
| Computer Studies      | - | 4 Units  |
| Faculty Courses       | - | 12 Units |
| Departmental Courses  | - | 95 Units |

## **1.10 AWARD OF DEGREES**

At the end of the programme, the classification of the student's degree will be based on the student's cumulative grade point average (CGPA).

The following classification will be adopted:

| <i>Class of Degree</i>                       | <i>CGPA</i>    |
|--|----------------|
| (i) First Class                              | 4.50 - 5.00    |
| (ii) Second Class ( <i>Upper Division</i> )  | 3.50 - 4.49    |
| (iii) Second Class ( <i>Lower Division</i> ) | 2.40 - 3.49    |
| (iv) Third Class                             | 1.50 - 2.39    |
| (v) Pass                                     | 1.00 - 1.49    |
| (vi) Fail                                    | Less than 1.00 |

## **1.11 ATTENDANCE POLICIES**

Attendance at lecture, tutorial and practical classes are compulsory. A minimum of 75% attendance is a prerequisite to sit for examinations, including in-course assessments

## **1.12 GENERAL CONDUCT AND DISCIPLINE**

Students in the Department of Biochemistry should not be involved in any malpractice such as cultism, examination malpractice, insubordination to teachers and other members of staff, fighting, community unrest, any form of dishonesty, etc. The dressing code must be strictly adhered to. Male students are expected to be in their shirts and trousers with ties. All students must put on their protective laboratory coats during practical classes.

## 2.0 OUTLINE OF COURSES

### 100 LEVEL HARMATTAN SEMESTER

| Grounding        | Course Code | Course Title             | Pre requisite | Lecture | Tutorial | Practical | Total load |
|------------------|-------------|--------------------------|---------------|---------|----------|-----------|------------|
|                  | FAA 101     | Fundamental of Drawing   | -             | 2       | 0        | 0         | 2          |
|                  | GNS 101     | Use of English I         | -             | 2       | 0        | 0         | 2          |
|                  | LIB 101     | Use of Library           | -             | 1       | 0        | 0         | 0          |
|                  | BIO 101     | Gen. Biology I           | -             | 3       | 0        | 3         | 3          |
|                  | BIO 103     | Experimental Biology I   | -             | 0       | 1        | 0         | 1          |
|                  | CHM 101     | General Chemistry I      | -             | 3       | 0        | 3         | 4          |
|                  | CHM 191     | Experimental Chemistry I | -             | 0       | 1        | 0         | 1          |
|                  | MTH 101     | Mathematical Method I    | -             | 4       | 1        | 0         | 5          |
|                  | PHY101      | Gen. Physics I           | -             | 3       | 0        | 3         | 4          |
|                  | PHY103      | Experimental Physics I   | -             | 0       | 1        | 0         | 1          |
| Elective Courses | NONE -      |                          |               |         |          |           |            |
|                  |             | <b>TOTAL</b>             |               |         |          |           | <b>23</b>  |

### 100 LEVEL RAIN SEMESTER

| Grounding        | Course Code | Course Title                        | Pre requisite | Lecture | Tutorial | Practical | Total load |
|------------------|-------------|-------------------------------------|---------------|---------|----------|-----------|------------|
|                  | GNS102      | Use of English II                   | -             | 2       | 0        | 0         | 2          |
|                  | GNS 104     | Value of Health & Sickness          | -             | 2       | 0        | 0         | 2          |
|                  | BIO 104     | Gen. Biology I                      | -             | 3       | 0        | 0         | 1          |
|                  | BIO 102     | General Biology II                  | -             | 0       | 0        | 3         | 3          |
|                  | CHM 102     | General Chemistry II                | -             | 3       | 1        | 0         | 4          |
|                  | CHM 192     | Experimental Chemistry II           | -             | 0       | 0        | 3         | 1          |
|                  | MTH 102     | Mathematical Method II              | -             | 4       | 1        | 0         | 5          |
|                  | PHY102      | Gen. Physics II                     | -             | 3       | 1        | 0         | 4          |
|                  | PHY104      | Experimental Physics II             | -             | 0       | 0        | 3         | 1          |
|                  | CSE 100     | Introduction to Computer Technology | -             | 1       | 0        | 0         | 1          |
| Elective Courses | NONE -      |                                     |               |         |          |           |            |
|                  |             | <b>TOTAL</b>                        |               |         |          |           | <b>24</b>  |

**200 LEVEL HARMATTAN SEMESTER**

| Course Code | Course Title                            | Pre requisite  | Lecture | Tutorial | Practical | Total load |
|-------------|---|----------------|---------|----------|-----------|------------|
| BCH 201     | Structure and Chemistry of Biomolecules |                | 2       | 0        | 3         | 3          |
| BCH 203     | Int. to Physical Biochemistry           |                | 3       | 0        | 0         | 2          |
| PSG 201     | General Principle of Physiology         |                | 3       | 0        | 0         | 3          |
| CHM 201     | Basic Inorganic Chemistry               |                | 2       | 0        | 3         | 4          |
| CSE 201     | Basic Computer Programming              |                | 2       | 0        | 3         | 3          |
| GNS 201     | Culture and Specialization Pattern      |                | 2       | 0        | 0         | 2          |
| GNS 209     | Elements of Administration              |                | 2       | 0        | 0         | 2          |
| MCB 201     | General Microbiology                    | <b>BIO 102</b> | 3       | 0        | 3         | 4          |
|             | <b>TOTAL</b>                            |                |         |          |           | <b>22</b>  |

**200 LEVEL RAIN SEMESTER**

| Course Code | Course Title                                 | Pre requisite      | Lecture | Tutorial | Practical | Total load |
|-------------|--|--------------------|---------|----------|-----------|------------|
| BCH 202     | Carbohydrate Metabolism and Regulation       |                    | 2       | 0        | 3         | 3          |
| BCH 204     | Metabolism of Lipids                         |                    | 2       | 0        | 3         | 3          |
| BIO 202     | Biological Techniques I                      | BIO 101<br>BIO 102 | 1       | 0        | 3         | 1          |
| BIO 206     | Cells and Molecular Biology                  | BIO 101<br>BIO 102 | 2       | 0        | 3         | 3          |
| CHM 202     | Basic Organic Chemistry                      | CHM 101<br>CHM 102 | 3       | 1        | 0         | 4          |
| CHM 204     | Experimental Inorganic and Organic Chemistry | CHM 101<br>CHM 102 | 0       | 0        | 1         | 4          |
| PSY 204     | Blood  |                    | 2       | 0        | 3         | 3          |
| ANA 204     | Basic Histology of Body System               | <b>BIO 102</b>     | 2       | 0        | 3         | 3          |
|             | <b>TOTAL</b>                                 |                    |         |          |           | <b>24</b>  |

**300 LEVEL HARMATTAN SEMESTER**

| Course Code | Course Title  | Pre requisite | Lecture | Tutorial | Practical | Total load |
|-------------|---|---------------|---------|----------|-----------|------------|
| BCH 301     | Metabolism of Amino Acid and Protein                          |               | 2       | 0        | 3         | 3          |
| BCH 305     | Endocrinology   |               | 3       | 0        | 0         | 3          |
| BCH 303     | Nucleic Acids   |               | 3       | 0        | 0         | 3          |
| BCH 307     | Inorganic Biochemistry  |               | 3       | 0        | 0         | 3          |
| BCH 391     | Experimental Biochemistry I                                   |               | 0       | 0        | 3         | 1          |
| CHM 351     | Introduction to Industrial Application of Chemical Principles |               | 2       | 1        | 0         | 2          |
| PHM 301     | Introduction to Pharmacology                                  |               | 2       | 0        | 3         | 3          |
| ANA 321     | Basic Histochemistry  |               | 2       | 0        | 3         | 3          |
|             | <b>TOTAL</b>  |               |         |          |           | <b>21</b>  |

**300 LEVEL RAIN SEMESTER**

| Course Code | Course Title  | Pre requisite | Lecture | Tutorial | Practical | Total load |
|-------------|---|---------------|---------|----------|-----------|------------|
| BCH 302     | Blood and Tissue Biochemistry                       |               | 3       | 0        | 0         | 3          |
| BCH 304     | Bio - Energetics                                    | BCH 201       | 2       | 0        | 0         | 2          |
| BCH 306     | Enzymes   |               | 2       | 0        | 3         | 3          |
| BCH 308     | Nutrition Biochemistry                              |               | 2       | 0        | 3         | 2          |
| BCH 310     | Immunology  |               | 2       | 0        | 3         | 2          |
| BCH 312     | Plant Biochemistry                                  |               | 2       | 1        | 0         | 3          |
| BCH 392     | Experimental Biochemistry II                        |               | 0       | 0        | 3         | 1          |
| STA 204     | Statistics for Agricultural and Biological Sciences |               | 3       | 1        | 0         | 4          |
|             | <b>TOTAL</b>  |               |         |          |           | <b>20</b>  |

#### **400 LEVEL HARMATTAN SEMESTER**

| Course Code  | Course Title                       | Pre requisite | Lecture | Tutorial | Practical | Total load |
|--------------|------------------------------------|---------------|---------|----------|-----------|------------|
| BCH 401      | Neurobiochemistry                  |               | 2       | 0        | 0         | 2          |
| BCH 403      | Clinical and Forensic Biochemistry | BCH 201       | 3       | 0        | 0         | 3          |
| BCH 405      | Xenobiochemistry                   |               | 3       | 0        | 0         | 3          |
| BCH 407      | Molecular Genetics                 | BCH 303       | 3       | 0        | 0         | 3          |
| BCH 409      | Industrial Fermentation            |               | 3       | 0        | 3         | 4          |
| BCH 411      | Analytical Biochemistry            | BCH 392       | 2       | 0        | 3         | 3          |
| <b>TOTAL</b> |                                    |               |         |          |           | <b>18</b>  |

#### **400 LEVEL RAIN SEMESTER**

#### **INDUSTRIAL ATTACHMENT/SIWES PROGRAMME - 6 UNITS**

#### **500 LEVEL HARMATTAN SEMESTER**

| Course Code  | Course Title                       | Pre requisite | Lecture | Tutorial | Practical | Total load |
|--------------|------------------------------------|---------------|---------|----------|-----------|------------|
| BCH 501      | Advanced Carbohydrate Biochemistry | BCH 202       | 2       | 0        | 3         | 3          |
| BCH 503      | Advanced Protein Biochemistry      | BCH 301       | 2       | 0        | 3         | 3          |
| BCH 505      | Advanced Lipid Biochemistry        | BCH 204       | 2       | 0        | 3         | 3          |
| BCH 507      | Bio-Informatics                    | BCH 407       | 2       | 0        | 0         | 2          |
| BCH 591      | Seminar                            | 0             | 0       | 0        | 9         | 3          |
| BCH 599      | Research Project                   |               | 0       | 0        | 9         | 3          |
| <b>TOTAL</b> |                                    |               |         |          |           | <b>17</b>  |

#### **500 LEVEL HARMATTAN SEMESTER**

| Course Code  | Course Title                   | Pre requisite | Lecture | Tutorial | Practical | Total load |
|--------------|--------------------------------|---------------|---------|----------|-----------|------------|
| BCH 502      | Membrane Biophysics            |               | 2       | 0        | 3         | 3          |
| BCH 504      | Toxicology                     | BCH 405       | 2       | 0        | 3         | 3          |
| BCH 506      | Advanced Enzymology            | BCH 306       | 2       | 0        | 3         | 3          |
| BCH 508      | Bio-chemistry of Free Radicals | BCH 405       | 3       | 0        | 0         | 3          |
| BCH 510      | Biotechnology                  | BCH 409       | 2       | 0        | 3         | 3          |
| BCH 599      | Research Project               |               | 0       | 0        | 9         | 3          |
| <b>TOTAL</b> |                                |               |         |          |           | <b>18</b>  |

\*Pre-requisite courses must be taken and passed before registering for corresponding courses.

\*Candidates having not more than 6 units of carry over in their second semester are eligible to partake in the SIWES programme.

( C )

## **POSTPROGRAMMES (PGD) (M.Tech) (M.Phil/Ph.D)**

1.0

### **INTRODUCTION/PHILOSOPHY:**

The philosophy of the graduate programme in Biochemistry is intended to give students a full comprehension of both the theoretical background, practical and application of medically relevant biochemical and molecular research. Acquisition of the knowledge and skills would enable students apply problem-solving and other applications such as practice of medicine, nursing, pharmacy, veterinary and laboratory medicine and other life sciences. The graduates would also be able to function in academia, laboratory and industrial settings, public service and/or in self-employment.

2.0

### **AIMS AND OBJECTIVES**

- The primary objectives of the programme are to:
- i. enable qualified graduates of Pure/Applied Biochemistry to upgrade their knowledge and to pursue higher degree programme in General Biochemistry;
  - ii. bridge the gap between the HND, AIST, AIMLT programmes (and equivalent) and the first degree programme of the University so as to enable the former to pursue higher Biochemistry.
  - iii. Enable graduates in related discipline who are presently employed in food, medical, pharmaceutical and other related industries to pursue higher degrees in General Biochemistry.
  - iv. train students to acquire basic and advanced knowledge of biochemical principles.
  - v. deepen students' knowledge and competency in the theory and practice of biochemistry.

- vi. train students to acquire sufficient practical knowledge and skills in experimental biochemistry.
- vii. train students to have adequate knowledge of applied biochemistry as used in medicine, pharmacy, nursing, dentistry, veterinary medicine, etc.
- viii. produce graduates who will meet high-level manpower needs of Nigeria industrial and professional sectors of the country's economy.

3.

### **COMPETENCIES AND SKILLS**

*In addition to the subject-specific knowledge enumerated above, on completion of their programme of study, students should have acquired the following levels of competence skill:*

- i. The students should have been sufficiently equipped with cognitive, intellectual and theoretical knowledge and abilities to teach biochemistry to undergraduate students in medicine/dentistry, pharmacy, nursing, medical laboratory science veterinary medicine, and other related medical sciences and/or disciplines;
- ii. The students should have acquired sufficient practical skills that will enable them solve any biochemistry or biochemistry-related problems in research laboratories, anywhere worldwide;
- iii. The students should have acquired enough skills to tackle new, innovative biochemical cases, and develop new ideas;
- iv. The students should be able to retrieve and store information, including literature search, using computer and other retrieval media (e.g current contents, index medicus, science citation index, etc);

- v. The students should be able to write all forms of "scientific papers' (e.g journal articles, conference papers, poster presentations, dissertations, thesis), etc.;
- vi. The students should have acquired enough skills to use computer for data analysis, graphical preparations and presentations, word processing, spreadsheet, statistics, internet, etc.

#### **4. POSTGRADUATE DEGREES OFFERED**

- i. Postgraduate Diploma (PGD) in Biochemistry (by course work)
- ii. Master of Technology (M.Tech) in Biochemistry (by course work)
- iii. Master of Philosophy/Doctor of Philosophy (M.Phil/Ph.D) in Biochemistry (by research).

#### **5. ADMISSION REQUIREMENTS**

Candidates seeking admission into any of the programmes must possess any of the followings:

##### **A. POSTGRADUATE DIPLOMA:**

- i. A bachelor's degree in Biochemistry with a minimum of third class degree
- ii. A bachelor's degree in Microbiology, Food Science and Technology, Chemistry and other related discipline with a minimum of third class
- iii. HND/Final Diploma (AIST/AIMLT) in Science/Medical Laboratory Technology and "related option with a minimum pass at credit level
- iv. The candidate must possess five O'level credits in GCE/SSCE/NECO to include English Language, Biology, Chemistry, Physics and Mathematics.

##### **B. MASTER OF TECHNOLOGY:**

- i. A first University degree with a minimum of second lower division in Biochemistry, Pharmacy, or any other Health-related discipline of LAUTECH, >fessional equivalents in medicine or Veterinary medicine from CH or any other University recognized by the Senate of LAUTECH.

Attained a satisfactory level of academic competence as judged by the University Senate on the advice of the Department of Biochemistry, Faculty of Basic Medical Sciences and College of Health Sciences.

##### **C. MASTER OF PHILOSOPHY (M.Phil)**

Candidates with 55 — 59.9%o weighted average in the M.Tech programme in Biochemistry of LAUTECH or its equivalent from any other University recognized by the Senate of LAUTECH can enter for the M.Phil programme of LAUTECH. The Candidate can proceed/convert to Ph.D degree programme upon scoring 60% weighted average and above in the M.Phil programme. An M.Phil/Ph.D candidate who is not successful in the conversion to the Ph.D level is permitted to terminate his/her study at the M.Phil level and shall be required to submit a thesis for examination.

##### **D. DOCTOR OF PHILOSOPHY (Ph.D):**

A Master of Technology degree in Biochemistry from LAUTECH (with a weighted average score of at least 60%) or its equivalent from the Master's degree programme of any University recognized by the Senate of LAUTECH. Ph.D Biochemistry is a research programme which will culminate in the submission of a Thesis for examination.

## **6.0 PROGRAMME DURATION**

The duration of a postgraduate diploma (PGD) in Biochemistry is expected to last for a minimum of 2 and maximum of 3 semesters, for **FULL-TIME** students, and a minimum of 4 and maximum of 6 semesters for **PART-TIME** students.

## **7.0 PGD BIOCHEMISTRY GRADUATION REQUIREMENTS**

For the award of PGD degree in Biochemistry, the student must have satisfied the following requirements:

Pass the prescribed courses listed hereunder, totaling 32 credits and to have successfully defended his/her project internally and in the presence of external examiner/s.

## **8.0 M. Tech BIOCHEMISTRY GRADUATION REQUIREMENTS**

For the award of M.Tech degree in Biochemistry, the student must have passed the prescribrd courses listed hereunder, totaling 34 credits with 28 compulsory/required courses and 6 elective courses. The student must successfully defend his/her project in the presence of internal and external examiner/s.

### **Course Duration:**

#### ***Full-time Student:***

Minimum of Three (3) and Maximum of Six (6) Semesters.

#### ***Part-time Student:***

Minimum of Four (4) and Maximum of Eight (8) Semesters.

## **9.0 PhD BIOCHEMISTRY GRADUATION REQUIREMENTS**

For the award of PhD degree in Biochemistry, the student must have satisfied the following requirements:

- i. Passed any or all course/s prescribed by the Department of Biochemistry on behalf of the Senate of LAUTECH.

- ii. Submitted a Thesis to LAUTECH based on the student's original research work, embodying the candidate's original contribution to scientific knowledge.
- iii. Passed an oral defence of the thesis before a set of internal and external examiners appointed by the appropriate authorities of LAUTECH.

### **Proposed Study Plan:**

- (a) Before registration, an applicant for the Master of Technology (M.Tech) degree programme by course work, or M.Phil/Ph.D degree programme by research, in the Department of Biochemistry, shall submit, for the approval of the University Senate through the Department, Faculty and College, a study plan of the proposed subject of study;
- (b) The Senate of LAUTECH may, at its discretion, decline to approve a study plan if, in its opinion:
  - (i) it is unsuitable, or
  - (ii) it cannot be profitably studied or pursued under the supervision of a University staff, or
  - (iii) the conditions under which the applicant proposes to work are unsatisfactory.
- (c) Ethical approval is required for all studies involving the use of animals and human subjects.

### **Supervision:**

The University Senate shall, on the recommendation of the Faculty/College Board of Study, appoint one or more appropriately-qualified supervisor/s, at least one of whom shall be a staff of the University, to guide, advise and supervise an M.Tech, M.Phil/Ph.D Student whose study plan and research topic have been approved.

### **Progression:**

A student who, after six (for M.Tech by course work) or eight (for M.Phil/Ph.D by research) semesters of full-time study, or eight (for

M.Tech by course work) or twelve (for M.Phil/Ph.D by research) semesters of study as a part-time student, has not completed the requirements for the award of the M.Tech, M.Phil or Ph.D degree, shall be required to apply for re-registration, which will only be permitted by the Senate of LAUTECH on receipt of a satisfactory motivation from the supervisor/s through the Faculty/College Board of Study.

#### **Submission of M.Tech Dissertation/M.Phil/Ph.D Thesis**

- (a) At the end of his or her study, every student for the M.Tech degree by course work, or M.Phil/Ph.D by research, in the Department of Biochemistry shall submit a dissertation (for M.Tech) or a Thesis (for M.Phil/Ph.D) embodying the results/findings of his/her original research work.
- (b) At least three months before a dissertation or thesis is to be submitted for examination, the student shall give notice, in writing, of his/her intention to submit such a dissertation or thesis, and the title thereof, to the Dean of the Faculty. However, in the event of a student failing to submit the dissertation or thesis for examination within six months thereafter, the notice will automatically lapse, and a further notice of intention to submit his/her dissertation or thesis shall be required.

#### **Format for M.Tech dissertation or M.Phil/Ph.D thesis:**

- (a) Every M.Tech dissertation or M.Phil/Ph.D thesis submitted for examination shall include a declaration stating that it has not been previously submitted for a degree of LAUTECH or any other University, and that it is the student's own original work;
- (b) Every M.Tech dissertation or M.Phil/Ph.D thesis submitted for examination shall be in such a format as prescribed by the Senate of LAUTECH and the rules of the Faculty/College, provided that each dissertation or thesis

shall include an 'abstract' (in English) not exceeding 350 words;

- (c) A dissertation or thesis may include one or more original research publications, with the student as the prime author, published or in press, in peer-reviewed, scientific journals approved by the Faculty/College Board of Study.

#### **Examination:**

- (a) On the advice of the Faculty/College Board of Study, the University Senate shall appoint for each dissertation or thesis, at least two examiners, one of whom shall be external to the University, who shall serve as 'external examiners' and will be responsible for external examination of the dissertation (for M.Tech) or thesis (for M.Phil/Ph.D);
- (b) A student's supervisor or co-supervisor will not be eligible for appointment as an examiner for the student's dissertation or thesis;
- (c) The Senate; at its discretion, may require a student to defend his or her M.Tech dissertation.

#### **Award of M.Tech degree with 'distinction';**

On the recommendation of the examiners, and in accordance with the relevant rules of the Faculty and College, M.Tech degree by course work, in the Department of Biochemistry may be awarded with 'distinction'.

#### **Conversion of M. Phil degree registration to Doctoral degree registration;**

In exceptional cases, and based on excellent academic performance, the University Senate, on the recommendation of the Faculty/College Board of Study, may convert M.Phil student's registration to a Doctoral (Ph.D) degree registration after four

semesters of outstanding academic/research performance by the M.Phil student. Such a student will, however, be required to continue his/her study as a doctoral student for a minimum of another two semesters before the doctoral degree can be conferred.

**Re-examination of dissertation/thesis:**

- (a) A failed (M.Tech by course work) dissertation or (M.Phil/Ph.D) thesis by research may not be re-examined;
- (b) On the advice of the Faculty/College Board of Study, the University Senate may invite a student to re-submit an M.Tech dissertation or M.Phil/Ph.D thesis in a revised or extended form.

**M.Phil (Terminal):**

55-59.9% of the weighted average score in the M.Phil degree examination.

**M.Phil/Ph.D By Research**

**11.0 POSTGRADUATE DIPLOMA (PGD) IN BIOCHEMISTRY  
COURSE OUTLINE First Semester**

**Total**

**19**

**Second Semester**

| Course code | Course Title | Lecture Hour | Practical Hour | Course Unit |
|-------------|--------------|--------------|----------------|-------------|
|             |              |              |                | <b>13</b>   |

**COURSE DESCRIPTION**

**BCH 601: Biochemistry of Carbohydrate (3units)**

Monosaccharides. Action of acids and bases on Monosaccharides, Disaccharides and Polysaccharides. Identification and analysis of monosaccharides, disaccharides and oligosaccharides. Polysaccharides. Glycoprotein, Glycolysis, Gluconeogenesis, Glycogenolysis, TCA cycle, Disorders of carbohydrate metabolism.

**BCH 602: Enzymology (3 units)**

Classification and nomenclature of enzymes, isolation, purification and characterization of enzymes, Active site, Enzyme inhibition, Principles of enzymatic methods of analysis. Glucose oxidase, GOT, GPT, Urease, Alkaline and acid phosphatases, amylase, lactate dehydrogenase,  $\alpha$ -glycosidase, Applications of enzymes. Vitamins and co-enzyme structure function relationship.

**BCH 603: Biochemistry of amino acid and proteins (3 Units)**

General importance of amino acid and proteins, Amino acid composition and sequence of proteins, transamination, decarboxylation and oxidative deamination, Biosynthesis and catabolism of essential and non-essential amino acids. Regulation of amino acid metabolism, Degradation of amino acid for energy and gluconeogenesis, Glucogenic and ketogenic amino acids, Biosynthesis and catabolism of protein, Biosynthesis of

oligopeptides. Urea cycle, Metabolism of one carbon compound. Metabolic disorders of amino acid and protein metabolism.

#### **BCH 604; Blood & Tissue Biochemistry (3 Units)**

Blood production (erythropoiesis), constituents of blood. Hemoglobin synthesis, the porphyrins. Blood electrolytes, acid-base balance. The kidneys; production of urine, renal function indices-urea, uric acid, creatinine and serum electrolytes. The liver, liver function indices-serum proteins, albumin, globulin, fibrinogen. Nerve and Muscle cells. Organization of Endocrine glands, Cellular communication by endocrine glands, Control of endocrine actions, Endocrine control of metabolism, water balance, reproduction. Mechanism of action of Insulin, thyroid hormones, glucagon and some sex hormones

#### **BCH 605: Lipid Biochemistry (3 Units)**

Classification of lipids -complex lipids, simple lipids. Saponifiable and non- saponifiable lipids. Fatty acid- essential and non-essential, characteristics, triglycerides, phosphoglycerides, sphingolipids, waxes terpenes and steroids. Oxidation of fatty acids. Formation and significance of ketone bodies. Biochemistry of adipose tissue. Biological membranes.

#### **BCH 606: Industrial Biochemistry (3 Units)**

Characteristics of industrial microorganisms; screening and strain improvement, metabolic pathways of industrial products. Primary and secondary metabolites; overproduction of industrial fermentation processes; continuous fermentation methods. Production of industrial chemicals-alcohols, organic acids, amino acids, vitamins, antibiotics; Single cell protein production. Enzyme production and application. Brewing-beer, wines, food fermentation; yeast fermentation. Waste disposal. Waste utilization. Microbial metabolism, media and air sterilization, power requirements in fermentation vessels, instrumentation and control of fermentation processes, chemicals and fuels via fermentation, production of antibiotics, cellulose and starch.

#### **BCH 607: Nucleic Acids Biochemistry (3 Units)**

Nucleic acid. Nomenclature of purine and pyrimidine bases, nucleosides and nucleotides. Hydrolysis of nucleic acids. Analysis of nucleotide sequence in nucleic acids. Nucleic acid - protein complexes. Experimental evidence leading to DNA as genetic material. RNA and DNA metabolism.

#### **BCH 608: Principles of Bioenergetics (2 Units)**

A review of the laws of thermodynamics. Free energy and free energy change. Couple reaction. Relationship between free energy change and equilibrium constant. Exergonic and endergonic reactions. The standard free energy of the hydrolysis of ATP. Structural basis of the free energy change during hydrolysis of ATP. The transfer potential of the phosphate group ATP. Oxidation — Reduction reactions. Electrode potential and the  $\text{H}_2\text{O}/\text{H}^+$  electrode. Oxidative phosphorylation and the energy-coupling hypothesis. Active transport.

#### **BCH 609: General Biochemical Methods (2 Units)**

Laboratory course consisting of experiments in areas of interest of academic staff. The course will expose students to current biochemical equipments and methods of research. Course will also include preparation of scientific seminars, dissertation or thesis and scientific papers.

#### **BCH 610: Seminar (2 Units)**

Literature search, presentation of seminars on comprehensive literature review of selected biochemistry topics

#### **BCH 619 Research Project (5 Units)**

Independent research in selected areas/topics of interest to the academic staff. Students will be required to perform laboratory experiments and produce written reports.

## **MASTER OF TECHNOLOGY DEGREE IN BIOCHEMISTRY (Programme of Study)**

A candidate must register a minimum of 34 credits comprising 28 credits of core courses and at least 6 credits of electives

### **Core Courses**

| <b>Course Code</b> | <b>Course Title</b>                 | <b>Credits</b> |
|--------------------|-------------------------------------|----------------|
| BCH 701            | General Biochemistry                | 2              |
| BCH 702            | Advanced Enzymology                 | 3              |
| BCH 703            | Membrane Biophysics                 | 2              |
| BCH 704            | Drug Metabolism and Toxicology      | 3              |
| BCH 705            | Immunology                          | 2              |
| BCH 706            | Endocrinology                       | 3              |
| BCH 707            | Clinical Biochemistry               | 2              |
| BCH 708            | MoJecular Biology and Biotechnology | 2              |
| BCH 709            | Analytical Techniques               | 3              |
| BCL 710            | Biostatistics                       | 1              |
| BCH 711            | Research Methodology                | 2              |
| BCH 712            | Seminar                             | 2              |
| BCH 713            | Research and Dissertation           | 5              |

### **Course Code**

| <b>Elective</b> | <b>Credits</b>             |   |
|-----------------|----------------------------|---|
| BCH714          | Clinical Pharmacokinetics  | 2 |
| BCH 716         | Advanced Neurobiochemistry | 2 |
| BCH 718         | Bioinformatics             | 2 |
| BCH 715         | Genomics and Proteomics    | 2 |
| BCH 717         | Nutritional Biochemistry   | 2 |

**First Semester Courses shall include:** BCH 701, 703, 705, 707 709, 711, 713 **Elective Courses:** BCH 715 and 717

**Second Semester Courses:** BCH 702, 704, 706, 708, 710, 712 **Elective Courses:** BCH 714, 716 and 718.

## **12.0 COURSE DESCRIPTION**

### **BCH 701 General Biochemistry (2 units)**

Overview of the structure and function of macromolecules in living organisms; integration and regulation of metabolism; biosynthesis of macromolecules; thermodynamics and bioenergetics; biochemical basis of genetics; molecular basis of inherited genetic disease and acquired diseases.

15h(T), 45h(P), C

### **BCH 702 Advanced Enzymology (3 units)**

Chemical kinetics and applied thermodynamics. Enztme kinetics; effects of inhibitors and activators on enzyme activity; allosteric effects. Mechanism of enzyme catalysis, ligand binding: Scatchard plot. Hill plot. Adair equation. Operon concept of enzyme induction and repression. Enzyme assay in clinical medicine.

30h(T), 45h(P), C

### **BCH 703 Membrane Biophysics (2units)**

Membrane structure and functions. Synthesis of membrane components (membrane biogenesis). Transport across various biological membranes. Bilayer compression and bending resistance. Electron transport and energy coupling in mitochondria and chloroplasts. Theories of oxidative phosphorylation. Membrane and transduction.

15h(T), 45h(P), C

### **BCH 704 Drug Metabolism and Toxicology (3 units)**

Administration, absorption, metabolism and excretion of drugs and other foreign compounds. Factors affecting the metabolism of xenobiotics. General principles of toxicology. Induction of microsomal enzymes and principles of drug resistance. Chemical compounds injurious to animals and man. Toxicity testing, factors affecting toxicity. Organelles and enzyme systems concerned with hepatic metabolism of xenobiotics. Carcinogens and teratogens.

30h(T), 45h(P),C

**BCH 705 Immunology** **(2 units)**

The molecular basis of immune reactions. Types, structures and functions of the immunoglobulins. Antigen-antibody reactions; antigenic determinants. Clonal expansion of B-cells; Plasma cells; T-cells. Some specialized proteins of the immune systems. Laboratory methods in immunology (radio-immuno assay (RIA); enzyme-linked immunosorbent assay(ELISA), etc.  
15h(T), 45h(P), R

**BCH 706 Endocrinology** **(3 units)**

Classification of hormones. Molecular mechanisms of hormonal action. The pituitary and hypothalamic hormones. Thyroid hormones; hormones regulating calcium metabolism. Hormones of the adrenal cortex and adrenal medulla. Hormones of the gonads, the pancreas and the gastrointestinal hormones. Deficiency diseases of hormones. Principle of hormonal assay.

30h(T), 45h(P), R

**BCH 707 Clinical and Forensic Biochemistry** **(2 units)**

Fluid and electrolyte imbalance, acid-base balance; Overview of metabolic derangements in diseases such as diabetes mellitus, hypertension and cholera, etc. Principles of methods used in the determination of biochemical parameters for diagnosis; plasma enzyme profile in clinical diagnosis: Estimation of serum and plasma proteins, total albumin, Liver function tests: AST, ALT, alkaline phosphatase, creatine kinase, lactose dehydrogenase (LDH). 15h(T), 45h(P) R

**BCH 708 Molecular Biology and Biotechnology** **(2 units)**

Biochemical aspect of cell division, cell cloning and cell fusion. Gene mutation and site-directed mutagenesis, mutagenic agents and consequences of mutation; Basic structure of eukaryotic gene and genome; Recombinant DNA technology methods and applications; Application of biotechnology to medicine. Gene cloning, The Human Genome Project, *Cloned genes and diagnosis, hormones and other*

*medicines, Vaccines. Gene therapy; Genomic libraries; social implications of biotechnology and ethical issues.*

15h(T), 45h(P), C

**BCH 709 Analytical Techniques** **(3 units)**

Manometry; spectroscopy; ultrafiltration; chromatography (paper, thin layer, ion exchange, gel filtration, affinity); electrophoresis; centrifugation; x-ray diffraction; autoradiography and other radio-labelling techniques.

30h(T), 45h(P), R

**BCH 710 Biostatistics** **(1unit)**

The involvement of statistics in planning and experimental design; Variable types (discrete and continuous random variables); Sampling methods and data grouping; standard deviation, correlation and regression, correlation coefficients, probability and inferential statistics.

15h(T), 45h(P), R

**BCH 711 Research Methodology** **(2 units)**

Study of some classical papers for experimental design and presentation of data; Principles, methodologies and applications of biochemical research techniques.

15h(T), 45h(P), R

**BCH 712 Seminar** **(2 units)**

A seminal on special topic in General/Medical Biochemistry should be written under supervision, with adequate literature search and presented. 90h(P), R

**BCH 713 Research and Dissertation** **(5 units)**

A dissertation based on original research conducted during the course of study for the M.Tech degree must be written and defended before a panel of examiners which must include external examiner. 225h(P), C

**ELECTIVES****BCH 714 Clinical Pharmacokinetics (2 units)**

Introduction to pharmacokinetics and pharmacodynamics; the time course of drugs in the body; absorption, distribution, metabolism and elimination; quantitative relationships between drug concentration and wanted or undesired effects. Selective character of drug action, and the dual character of drug action; food drug interactions. Dose-effect relationship of drug action, dose-effect curves, threshold dose, therapeutic dose, maximal dose, toxic dose and lethal dose. The principle of plasma protein binding, half life. Hepatic microsomal drug metabolism and cytochrome P450); Application of drug plasma concentration monitoring.

15h(T), 45h(P), E

**BCH 716 Advanced Neurobiochemistry (2 units)**

Overview of Neurons and Signalling; Electrical Signals of Neurons; Voltage-dependent Membrane Permeability; Channels and Transporters; Synaptic Transporters; Neurotransmitters and their receptors; intraneuronal communications; Neuropathologies; Drugs of Abuse; The Chemical Senses.

15h(T), 45h(P), E

**BCH 718 Bioinformatics (2 units)**

Introduction to Bioinformatics; Models, formalisms and algorithms; Biological sequences; Strings, Sequence tools the GCG package; Patterns and motifs; Regular expressions, Hidden-Markov-Models and neural nets; Sequence comparison I; concepts, similarity and homology; Scoring matrices, Sequence comparison II: Genome analysis, Homology modeling, Protein structure prediction.

15h(T), 45h(P), E

**BCH 715 Genomics and Proteomics (2 units)**

The structure, function and evolution of the human genome; Strategies for large-scale sequence projects; Human disease gene; Expression; Bioinformatics for the analysis of sequence data; approaches for determining gene expression patterns and functions; Protein structure, secondary structure and supersecondary structure; Mechanism of protein folding, tertiary folds; formation of oligomers; relationship between protein structure and function; Structure prediction and human proteomics; Protein structure and drug discovery.

15h(T), 45h(P), E

**BCH 717 Nutritional Biochemistry (2 units)**

Current concepts and issues in nutrition; nutritional disorders, their prevention and therapy; Nutritional surveys and assessment of nutritional status; Detailed examination of biochemical and medical aspects of nutritional status.

15h(T), 45h(P), E

### **(3) DEPARTMENT OF PHYSIOLOGY**

#### **(A) MBBS PROGRAMME**

##### **COURSE CONTENT**

##### **200 LEVEL HARMATTAN SEMESTER**

#### **1. BASIC SCIENCE REVIEW AND GENERAL PHYSIOLOGY**

- Cell structure and functions, cell damage and ageing
- Mathematical and Physical Principles.

Quantitative Measurements:- mg%, Eq/L, molarity, osmolarity and their applications, pH notations

-Biophysical principles and mechanisms: Transport systems within and across biological membranes: Osmosis, diffusion (passive and facilitated) and active transport

-Perspectives in Physiology: Control of the internal environment: Feed-forward and Feed-back (negative and positive) Mechanisms.

- Organisms as steady state systems.

#### **2. NERVE AND MUSCLE PHYSIOLOGY**

-A review of transport across cell membranes, resting membrane potential and action potential (of muscles and nerves separately).

- Conduction of impulses along nerve fibers.
- Threshold stimulus, rheobasic intensity and chronaxie
- The strength – duration curve.
- Neuro-muscular transmission:
  - Excitation contraction coupling in skeletal muscles:
  - Molecular basis of muscular contraction.
  - Contractile and regulatory proteins
  - Muscle energetics

#### **3. BLOOD AND IMMUNITY**

Physiological functions of blood.

- Erythropoiesis:** structure and function of red blood cells;
- Osmotic fragility test, anaemia and jaundice.
- Composition and functions of plasma
- White blood cells:  
structure, functions and disorders of the components.

##### **- Blood Groups:**

- ABO and Rhesus including cross-matching and reactions.
- Haemostasis: Clotting factors and mechanism; including anticoagulants and anti-clotting mechanisms
- Basic immunity:** natural and acquired immunity, development of immune system, immune mechanism and reaction, the complement system.

#### **End of Semester Progressive Assessment**

#### **200 L RAIN SEMESTER**

#### **4. CARDIOVASCULAR PHYSIOLOGY**

Structural adaptation of cardiovascular system to its functions

- Physiologic properties of cardiac muscle- (Length-Tension relation, Spontaneous rhythm and prolonged repolarisation)
- Electrocardiography
- Structure/Mechanical activity of the Heart:  
The cardiac cycle
- Cardiac performance: Heart rate, cardiac output, venous return etc.

##### **General principles of Haemodynamics.**

- Arterio-venous system
- Regulation of the heart and the peripheral circulation.
- Microcirculation and lymphatics

**Regional circulation:**

- Pulmonary and Coronary
- Cerebral and Foetal
- Cutaneous, splanchnic and skeletal
- Cardiovascular changes during exercise

**Cardiac failure:** circulatory shock

- Immediate and delayed responses following hemorrhage
- Syncope
- Hypertension

**5. PULMONARY PHYSIOLOGY****Pulmonary structure and function****Mechanism of breathing**

- Surfactant
- Lung volumes, capacities and dead space
- Methods of measurement and factors that influence them
- Gas Exchange
- Alveolo-pulmonary capillary gas exchange.
- Factors involved.
- Ventilation – perfusion relationship.
- Oxygen transport and oxygen dissociation curve
- Carbon dioxide transport
- Hypoxia, hypoxemia, hypercapnia etc.

**Chemical control of respiration**

- Peripheral and central chemoreceptors
- Acid-base balance

**Neural control of respiration**

- Respiration in abnormal environment:
- Foetal
- Exercise
- Altitude, including acclimatization
- High pressure environment including deep sea diving and decompression sickness.

**6. RENAL PHYSIOLOGY****Organization of the kidney including renal haemodynamics****- Physiological functions of the kidney**

- Non-urinary functions of the kidney (e.g. endocrine, metabolic, Blood pressure etc) including kidney as a homeostatic organ.
- An outline of renal functional mechanism – analysis of glomerular and tubular function.
- Mechanism of glomerular ultra-filtration and measurement of glomerular filtration rate (GFR) in man
- Proximal tubular reabsorptive mechanisms.
- Distal tubular secretary and reabsorptive mechanisms.
- Loop of Henle: hair-pin, counter-current multiplier and exchanger, its role in renal osmo-regulation of body fluids
- Renal thresh-hold, tubular maximum, Renal Plasma clearance, and its use in the evaluation of renal function.
- Composition of normal urine and micturition

**Total body water and compartments of the fluid spaces.**

- Different body water compartments
- Trans-cellular and special fluid spaces in the body
- Mechanisms and methods for the measurement of each fluid space
- Inter-relationships of body fluid spaces.
- Gibbs-Donna equilibrium

**Acid-Base Chemistry:**

- Including body fluids, buffers and the regulation of hydrogen ion,
- Renal regulation of acid base balance
- Metabolic acidosis and alkalosis

**End of Semester Progressive Assessment**

## **300 LEVEL HARMATTAN SEMESTER**

### **7. GASTRO-INTESTINAL PHYSIOLOGY**

- Organization of the gastrointestinal tract, structural adaptation of the GIT compartments including the sphincters.
- Innervations of the gut and the autonomic control of G.I.T.
- **GIT motility**: -deglutition, gastric motility, motility of the small and large intestine.
- **GIT Hormones**: Composition, mechanisms of secretion and functions of saliva, gastric secretion (Hydrochloric acid), bile, pancreatic and intestinal secretions
- **Digestion and absorption** of carbohydrates, fats and proteins, vitamins and minerals
- Pathophysiology of G.I.T.
- ATP as the common pathway of all energy
- Energy utilization and regulation
- General aspects of nutrition  
Body requirements – protein, vitamin and minerals

### **8 ENDOCRINE PHYSIOLOGY**

- Introduction and basic principles of endocrinology
- Nature of hormones, synthesis, release and transport
- Measurement and mechanisms of hormone action
- Control of Endocrine system
- **The Pituitary gland**
- The thyroid gland
- **The parathyroid gland** and mineral homeostasis.
- The endocrine pancreas, the adrenal gland

### **9. REPRODUCTIVE PHYSIOLOGY**

- Primary and accessory organs of sex
- Puberty and secondary sexual characteristics
- Male Reproductive tract
- The testis and spermatogenesis including physiology of coitus
- Female reproductive tract

- Cyclical changes in the matured non-menopausal female including the physiology of the ovary, fertilization and activation.
- Pregnancy including physiological changes during pregnancy. Placental function and parturition
- The mammary gland, lactation and suckling i.e the milk let-down reflex.

## **End of Semester Progressive Assessment**

## **300 LEVEL RAIN SEMESTER**

### **10. NEUROPHYSIOLOGY (PNS & CNS)**

- Introduction to nervous system organization
- Synaptic and junctional transmission
- Somato-sensory physiology
- Ascending spinal tracts, thalamus and sensory cortex
- Physiology of pain
- Reflex organization of motor neurons and its control of muscle
- Monosynaptic stretch reflex, tendon jerk, plantar reflex
- The lower motor neurons
- Motor cortex cortico-spinal tract pyramidal tract lesion
- Posture, the extrapyramidal pathways and regulation of posture
- Basal ganglia:- control of movement and posture including function and dysfunction
- Cerebellum and motor function/equilibrium
- Ascending/descending reticular systems: influence, including sleep-wakefulness
- The limbic system and physiology of motivation
- Physiological correlates of learning and memory
- Other aspects of psychology including behaviour, emotion, intelligence, personality development etc.

**11. AUTONOMIC NERVOUS SYSTEM**

- General introduction
- Organization of autonomic innervations
- Sympathetic system and Parasympathetic system
- Control/regulation of visceral functions

**12. THERMOREGULATION**

- Basic concepts
- Heat balance/Heat transfer
- Neural structures involved in temperature regulation
- Behavioral and abnormalities of body temperature regulation

**13. SPECIAL SENSES**

- The Eye: Structure and function, scotopic and photopic vision, colour, vision accommodation, visual acuity, visual pathway and pupillary light reflex
- Errors of refraction and experiments on visual function
- Ear: Auditory function, Hearing, Deafness
- Auditory pathway, Determination of Loudness and pitch
- Smell: Physiology of olfaction, olfactory pathway
- Taste: Taste pathways; Taste reflexes

**End of Semester Progressive Assessment**

**FIRST PROFESSIONAL (PART I MBBS EXAMINATION)**

## **(B) BACHELOR OF TECHNOLOGY PROGRAMME**

### **OBJECTIVES**

- (i) To produce potential medical scientists to meet the dire need for personnel in the basic medical sciences in universities and other health institutions including research institution as well as the ministries of science and technology.
- (ii) To produce exercise physiologists who will find employment with local, state and Federal sport councils/ministries and teams as well as the growing privately owned gymnastic and physical rehabilitation centers.
- (iii) To provide a basis for understanding the physiology and biochemistry of model systems that can be used for studying the reciprocal effects of humans and their environments as well as the effect of toxicants on them.
- (iv) To prepare specialists for work with local, state and federal health agencies, environmental protection and ecology-oriented agencies, occupational health programmes, hospitals/clinics and environmental consulting firms.
- (v) To produce graduates who will be employers of labour in human physiology, sports physiology, clinical physiology and environmental physiology and toxicology.

### **ADMISSION REQUIREMENTS:**

- (i) Candidates seeking admission through UME must meet the minimum university's requirement of five credit level passes at ordinary level (O' Level) examination in English Language, Mathematics, Chemistry, Physics and Biology.
- (ii) Candidates seeking admission through pre-degree science Programme must meet the minimum entry requirements of the Board of predegree science programme and pass the courses at acceptable level.
- (iii) For direct entry, candidates must possess advance level (A Level) passes in Biology, Chemistry and either Mathematics or Physics. Holders of the National Diploma with upper

credit and with a good background in human health and biology may be considered for admission. However, this category of students must possess the minimum O' Level entry requirements as stated in (i)

### ***Physiology (including Psychology) Lectures, Practicals and Tutorials***

Introductory lectures shall include a review of the basic concepts of Mathematics, Physics, Chemistry and Biology relevant to the study of Human physiology followed by perspectives in Physiology. General physiology, nerve and Muscle Physiology, Body fluids and Blood. Practical classes on simple muscle twitch and blood including the common blood values ..

#### **First Year: Rain Semester**

Cardiovascular Physiology (Circulation), Respiratory Physiology, and Renal Physiology shall be covered. At least two Laboratory practicals will be given per each of the systems.

#### **Second Year: Harmattan Semester**

The following systems are to be covered, gastro-intestinal physiology, endocrinology and reproductive Physiology. One to two Laboratory sessions will be schedules per each of the systems taught.

#### **Second Year: Rain Semester**

This Semester shall be devoted to different aspect of neurophysiology. The following areas will be covered before the students take their Professional (PART 2 MBBS). Degree examination, before going into the clinical years; Peripheral and central nervous systems, automatic nervous system, thermoregulation and special senses. Minimum of four laboratory sessions will be given in the area of neurophysiology.

## **REQUIREMENTS FOR THE AWARD OF A DEGREE**

To be eligible for the award of a degree, a candidate must satisfy the following conditions.

- (i) Pass all University/Faculty compulsory courses
- (ii) Pass all Department compulsory courses
- (iii) Not spend more than the minimum no of Semesters prescribed by the University.

## **FORMATS FOR EXAMINATION**

The examination shall be in five parts:

1. Continuous Assessment of theoretical knowledge 30%
2. Continuous Assessment of practical knowledge
3. Theory paper I - multiple choice question (MCQ)
4. Theory paper II - short and long essay questions
5. During the second semester of 500 Level there shall be project defense/viva voce.

## **CLASSIFICATION OF DEGREE**

- (a) The Cumulative Grade Point Average (CGPA) shall be used for the determination of the class of degree.
- (b) (i) The Grades to be used for students who satisfactorily complete the requirement of a course by the end of the semester are:

| <b>Letter grade</b> | <b>Mark</b> |
|---------------------|-------------|
| A                   | 70 & above  |
| B                   | 60-69.9     |
| C                   | 50-59.9     |
| D                   | 45-49.9     |
| E                   | 40-44.9     |
| F                   | <40         |

- (ii) The class of the degree of student who has satisfactorily completed his/her course of studies shall be determined as follows

| <b>Cumulative grade point average</b> | <b>Class</b>       |
|---------------------------------------|--------------------|
| 4.50-5.00                             | First Class        |
| 3.50-4.49                             | Second Class Upper |
| 2.40-3.49                             | Second Class Lower |
| 2.00-2.39                             | Third Class        |
| 1.00-1.99                             | Pass               |

- (c) (i) In order to obtain the C.G.P.A of a candidate, the appropriate index (grade point) assigned to each range of numerical marks are multiplied by the course unit and the products added up to give the weighted grade points. The total course units taken (pass or fail) to obtain the C.G.P.A.
- (d) (ii) The C.G.P.A shall be expressed correct to two decimal places

## OUTLINE OF COURSES

All 100 Level Students offer general courses.

### HARMATTAN SEMESTER

| Course Code  | Course Title             | Pre-requisite | Hours L T P | Units     |
|--------------|--------------------------|---------------|-------------|-----------|
| BIO 101      | General Biology I        |               | 2 1 0       | 3         |
| BIO 103      | Experimental Biology I   |               | 0 0 3       | 1         |
| CHM 101      | General Chemistry        |               | 2 1 0       | 4         |
| CHM 191      | Experimental Chemistry I |               | 0 0 3       | 1         |
| FAA 101      | Fundamental of Drawing   |               | 2 0 0       | 2         |
| GNS 101      | Use of English I         |               | 2 0 0       | 2         |
| MTH 101      | Elementary Mathematics   |               | 4 1 0       | 5         |
| PHY 101      | General Physics I        |               | 3 1 0       | 4         |
| PHY 103      | Experimental Physics     |               | 0 0 3       | 1         |
| LIB 101      | Use of Library           |               | 0 0 0       | 0         |
| <b>TOTAL</b> |                          |               |             | <b>23</b> |

### 100 LEVEL RAIN SEMESTER

| Course Code  | Course Title              | Pre-requisite | Hours L T P | Units     |
|--------------|---------------------------|---------------|-------------|-----------|
| BIG 102      | General Biology II        |               | 2 1         | 3         |
| BIG 104      | Experimental Biology II   |               | 0 0         | 4         |
| CHM 102      | General Chemistry II      |               | 2 1 0       | 4         |
| CHM 192      | Experimental Chemistry II |               | 0 0 3       | 1         |
| CSE 102      | Introduction to Computer  |               | 2 0 0       | 1         |
| GNS 106      | Use of English II         |               | 2 0 0       | 2         |
| MTH 101      | Elementary Mathematics II |               | 4 1 0       | 5         |
| PHY 101      | General Physics II        |               | 3 1 0       | 4         |
| PHY 103      | Experimental Physics II   |               | 0 0 3       | 1         |
| <b>TOTAL</b> |                           |               |             | <b>24</b> |

### 200 LEVEL HARMATTAN SEMESTER

| S/N          | Course Code | Course Title                          | Pre-requisite | Compulsory | Required | Elective | Hours L. T. P. | Units     |
|--------------|-------------|---------------------------------------|---------------|------------|----------|----------|----------------|-----------|
| 1            | PSG 201     | General Physiology                    | -             | -          | -        | -        | 2 0 0          | 2         |
| 2.           | PSG 271     | Nerve and Muscle Physiology           | -             | -          | -        | -        | 2 0 0          | 2         |
| 3            | PSG 211     | Blood and Immune System               | -             | -          | -        | -        | 2 1 0          | 3         |
| 4            | PSG 221     | Cardiovascular Physiology             | -             | -          | -        | -        | 2 1 0          | 3         |
| 5.           | BCH 201     | Structure & Chemistry of Biomolecules | -             | -          | -        | -        | 2 0 0          | 2         |
| 6.           | CSE 201     | Basic Computer Programming            | -             | -          | -        | -        | 2 0 0          | 2         |
| 7.           | ANA 209     | Gross Anatomy I (Upper & Lower Limb)  | -             | -          | -        | -        | 2 0 0          | 2         |
| 8            | ANA 231     | General Embryology & Genetics         | -             | -          | -        | -        | 2 0 0          | 2         |
| 9.           | GNS 201     | Culture and Socialization Pattern     | -             | -          | -        | -        | 2 0 0          | 2         |
| 10           | PSG 281     | Physiology Practicals                 | -             | -          | -        | -        | 2 0 0          | 1         |
| <b>TOTAL</b> |             |                                       |               |            |          |          |                | <b>21</b> |

200 LEVEL RAIN SEMESTER

| S/N | Course Code  | Course Title                               | Pre-requisite | Compulsory | Required | Elective | Hours L. T. P. | Units |
|-----|--------------|--|---------------|------------|----------|----------|----------------|-------|
| 1   | PSG 242      | Respiratory Physiology                     | -             | -          | -        | -        | 2 1 0          | 2     |
| 2.  | PSG 232      | Blood Fluid and Renal Physiology           | -             | -          | -        | -        | 2 1 0          | 2     |
| 3.  | PSG 252      | GIT & Metabolism                           | -             | -          | -        | -        | 2 1 0          | 3     |
| 4   | BCH 224      | Enzyme & Intermediary Metabolism           | -             | -          | -        | -        | 2 1 0          | 2     |
| 5   | ANA 214      | Gross Anatomy I (thorax pelvis & perineum) | -             | -          | -        | -        | 2 0 0          | 2     |
| 6   | ANA 282      | General Histology                          | -             | -          | -        | -        | 1 0 0          | 2     |
| 7   | BIG 206      | Cell and Molecular Biology                 | -             | -          | -        | -        | 2 1 0          | 3     |
| 8   | PHY 212      | Medical Physics                            | -             | -          | -        | -        | 2 0 0          | 2     |
| 9   | PSG 282      | Physiology Practicals                      | -             | -          | -        | -        | 0 0 0          | 2     |
|     | <b>TOTAL</b> |  |               |            |          |          |                |       |

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300 LEVEL HARMATTAN SEMESTER

| S/N | Course Code | Course Title                           | Pre-requisite      | Compulsory | Required | Elective | Hours L. T. P. | Units |
|-----|-------------|--|--------------------|------------|----------|----------|----------------|-------|
| 1   | PSG 361     | Endocrinology I                        | -                  | -          | -        | -        | 2 0 0          | 2     |
| 2.  | PSG 363     | Endocrinology II                       | -                  | -          | -        | -        | 2 1 0          | 3     |
| 3   | PSG 365     | Reproductive Physiology                | PSG 364<br>PSG 363 | -          | -        | -        | 2 1 0          | 3     |
| 4   | PSG 371     | Autonomic Nervous System               | -                  | -          | -        | -        | 2 0 0          | 2     |
| 5.  | PSG 303     | Integument System / Thermoregulation   | -                  | -          | -        | -        | 2 0 0          | 2     |
| 6.  | PHM 301     | Introduction to Pharmacology           | -                  | -          | -        | -        | 2 0 0          | 2     |
| 7.  | URP 311     | Site Selection & Planning              | -                  | -          | -        | -        | 2 0 0          | 2     |
| 8   | APH 305     | Feeds and Feedings                     | -                  | -          | -        | -        | 2 0 0          | 2     |
| 9.  | PSG 381     | Principles of Environmental Physiology | -                  | -          | -        | -        | 2 0 0          | 2     |
| 10  | PSG 383     | Physiology Practicals                  | -                  | -          | -        | -        | 0 0 3          | 1     |
|     |             | TOTAL                                  |                    |            |          |          |                |       |

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### **300 LEVEL RAIN SEMESTER**

| S/N       | Course Code | Course Title                | Pre-requisite                            | Compulsory | Required | Elective | Hours L. T. P. | Units    |
|-----------|-------------|-----------------------------|--|------------|----------|----------|----------------|----------|
| 1         | PSG 372     | Neurophysiology I           | -  | -          | -        | -        | 2 0 3          | 3        |
| 2.        | PSG 374     | Neurophysiology II          | -  | -          | -        | -        | 2 1 0          | 3        |
| 3         | ANA 306     | Head & Neck & Brain Anatomy | PSG 364<br>PSG 363 -                     | -          | -        | -        | 2 1 0          | 3        |
| <b>81</b> | <b>4</b>    | <b>PSG 302</b>              | <b>Introduction to Psychology</b>        | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>5.</b>   | <b>CHM 342</b>              | <b>Separation Methods</b>                | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>6.</b>   | <b>BCH 308</b>              | <b>Nutritional Biochemistry</b>          | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>7.</b>   | <b>FSE 314</b>              | <b>Basic Food Microbiology</b>           | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>8</b>    | <b>PSG 382</b>              | <b>Sport &amp; Exercise Physiology I</b> | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>9.</b>   | <b>PSG 384</b>              | <b>Practicals Physiology</b>             | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           |             |                             | <b>TOTAL UNITS</b>                       |            |          |          | <b>0 0 3</b>   | <b>1</b> |

### **400 LEVEL HARMATTAN SEMESTER**

| S/N       | Course Code | Course Title                 | Pre-requisite                              | Compulsory | Required | Elective | Hours L. T. P. | Units    |
|-----------|-------------|------------------------------|--|------------|----------|----------|----------------|----------|
| 1         | BST 401     | Biostatistics                | -  | -          | -        | -        | 2 1 0          | 2        |
| 2.        | PSG 481     | Physiology of Adaptation     | -  | -          | -        | -        | 2 1 0          | 3        |
| 3.        | PHM 401     | Principle of Toxicology      | -  | -          | -        | -        | 2 1 0          | 3        |
| 4         | PSG 485     | Instrumentation and Biometry | -  | -          | -        | -        | 1 0 3          | 2        |
| <b>82</b> | <b>5</b>    | <b>PSG 487</b>               | <b>Clinical Physiology I</b>               | <b>-</b>   | <b>-</b> | <b>-</b> | <b>1 0 3</b>   | <b>2</b> |
|           | <b>6</b>    | <b>ANA 421</b>               | <b>Histochemistry &amp; Cytochemistry</b>  | <b>-</b>   | <b>-</b> | <b>-</b> | <b>1 0 3</b>   | <b>2</b> |
|           | <b>7</b>    | <b>PSG 403</b>               | <b>Methods in Physiological Research I</b> | <b>-</b>   | <b>-</b> | <b>-</b> | <b>1 0 3</b>   | <b>2</b> |
|           | <b>8</b>    | <b>GNS 209</b>               | <b>Elements of Administration</b>          | <b>-</b>   | <b>-</b> | <b>-</b> | <b>1 0 0</b>   | <b>1</b> |
|           | <b>9</b>    | <b>PSG 405</b>               | <b>Biotechnology</b>                       | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           | <b>10</b>   | <b>APG 508</b>               | <b>Animal Products</b>                     | <b>-</b>   | <b>-</b> | <b>-</b> | <b>2 0 0</b>   | <b>2</b> |
|           |             |                              | <b>TOTAL UNITS</b>                         |            |          |          |                |          |

**400 LEVEL RAIN SEMESTER**  
**SIWES PROGRAMME - 8 UNITS**  
 (eligible 400 level students will go for  
 industrial training during the rain semester)

**500 LEVEL HARMATTAN SEMESTER**

**SIWES PROGRAMME - 8 UNITS**  
 (eligible 400 level students will go for  
 industrial training during the rain semester)

courses are not core course (i.e compulsory courses) ..

| <b>SIWES ELIGIBILITY CRITERIA</b>   |  |  |  |  |  |  |
|---|--|--|--|--|--|--|
| All 400 level students who have no carry-over in any of the core courses and those not on probation are eligible. However, candidates having not more than 6 units of carry over in their second semester are eligible to partake in the SIWES Programme provided those |  |  |  |  |  |  |

| S/N | Course Code | Course Title                                   | Pre-requisite | Compulsory | Required | Elective | Hours L.T.P. | Units |
|-----|-------------|--|---------------|------------|----------|----------|--------------|-------|
| 1   | PSG 501     | Advanced Blood G.I.T, Body Fluid/Renal         | -             | -          | -        | -        | 2 0 0        | 2     |
| 2.  | PSG 503     | Advanced Respiration and Cardiovascular System | -             | -          | -        | -        | 2 0 0        | 2     |
| 3   | PSG 505     | Advanced Endocrinology and Reproduction        | -             | -          | -        | -        | 2 0 0        | 2     |
| 4   | PSG 577     | Advance Neurophysiology                        | -             | -          | -        | -        | 2 0 0        | 2     |
| 5   | PSG 505     | Comparative Physiological Research             | -             | -          | -        | -        | 2 0 0        | 2     |
| 6.  | PSG 509     | Methods in Physiological Research              | -             | -          | -        | -        | 2 0 0        | 2     |
| 7.  | PSG 591     | Special Literature Review Seminar              | -             | -          | -        | -        | 2 0 3        | 3     |
|     |             | <b>TOTAL UNITS</b>                             |               |            |          |          | 1 0 3        | 2     |

**500 LEVEL RAIN SEMESTER**

| S/N | Course Code | Course Title           | Pre-requisite | Compulsory | Required | Elective | Hours L.T.P. | Units |
|-----|-------------|------------------------|---------------|------------|----------|----------|--------------|-------|
| 1   | PSG 592     | Research Project       | -             | -          | -        | -        | 0 0 1 8      | 6     |
| 2.  | PSG 582     | Sports & Exercise II   | -             | -          | -        | -        | 2 1 0        | 3     |
| 3   | PSG 584     | Psychophysiology       | -             | -          | -        | -        | 2 0 0        | 2     |
| 4   | PSG 586     | Clinical Physiology II | -             | -          | -        | -        | 1 0 3        | 2     |
|     |             | <b>TOTAL UNITS</b>     |               |            |          |          |              |       |

#### **(4) DEPT. OF MEDICAL LABORATORY SCIENCES**

The Department of Medical Laboratory Sciences is saddled with the responsibility of training of students to become Medical Laboratory Scientists. Course unit system is in operation in the department. Training of Medical Laboratory scientists comprises practical training through posting to teaching hospital laboratories and that theoretical instruction through didactic lectures.

#### **COURSE OUTLINE 100 LEVEL HARMATTAN SEMESTER**

| Grounding        | Course Code | Course Title             | Lecture | Tutorial | Practical | Total Unit |
|------------------|-------------|--------------------------|---------|----------|-----------|------------|
|                  | FAA 101     | Fundamental of Drawing   | 2       | 0        | 0         | 2          |
|                  | GNS 101     | Use of English I         | 2       | 0        | 0         | 2          |
|                  | LIB 101     | Use of Library           | 1       | 0        | 0         | 1          |
|                  | BIO 101     | General Biology I        | 3       | 0        | 3         | 3          |
|                  | BIO 103     | Experimental Biology I   | 0       | 1        | 0         | 3          |
|                  | CHM 101     | General Chemistry I      | 3       | 0        | 3         | 4          |
|                  | CHM 191     | Experimental Chemistry I | 0       | 1        | 0         | 3          |
|                  | MTH 101     | Mathematical Method I    | 4       | 1        | 0         | 5          |
|                  | PHY 101     | General Physics I        | 3       | 0        | 3         | 4          |
|                  | PHY 103     | Experimental Physics I   |         |          |           |            |
| Elective Courses | NONE        |                          |         |          |           |            |
|                  |             | <b>TOTAL</b>             |         |          |           | <b>30</b>  |

**100 LEVEL RAIN SEMESTER**

| Grounding | Course Code | Course Title                      | Lecture | Tutorial | Practical | Total Unit |
|-----------|-------------|-----------------------------------|---------|----------|-----------|------------|
|           | GNS101      | Use of English II                 | 2       | 0        | 0         | 2          |
|           | GNS104      | Science and Technology in African | 2       | 0        | 0         | 2          |
|           | BIO 102     | General Biology I                 | 3       | 0        | 0         | 3          |
|           | BIO 104     | General Biology II                | 0       | 0        | 3         | 3          |
|           | CHM 102     | General Chemistry II              | 3       | 1        | 0         | 4          |
|           | CHM 104     | Experimental Chemistry II         | 0       | 0        | 3         | 3          |
|           | MTH 102     | Mathematics Method II             | 4       | 1        | 0         | 5          |
|           | PHY102      | General Physics II                | 3       | 1        | 0         | 4          |
|           | PHY104      | Experimental Physics II           | 0       | 0        | 3         | 3          |
|           |             | <b>TOTAL</b>                      |         |          |           | <b>29</b>  |

**200 LEVEL HARMATTAN SEMESTER**

| Course Code | Course Title                                 | Lecture | Tutorial | Practical | Total Unit |
|-------------|--|---------|----------|-----------|------------|
| BCH 211     | General Biochemistry I                       | 2       | 0        | 2         | 2          |
| BIO 213     | Bioenergetics & Metabolism                   | 2       | 0        | 0         | 2          |
| PSG 211     | General Principle of Physiology I            | 2       | 0        | 3         | 3          |
| PSG 213     | General Principle of Physiology II           | 2       | 0        | 3         | 3          |
| BSS 201     | Introduction to Medical Laboratory Science 1 | 2       | 0        | 0         | 2          |
| GNS201      | Culture and Specialization Pattern           | 1       | 0        | 0         | 1          |
| CSE 201     | Introduction to Computer Programme           | 2       | 1        | 0         | 3          |
| ANA209      | Gross Anatomy 1                              | 2       | 0        | 3         | 3          |
|             | <b>TOTAL</b>                                 |         |          |           | <b>19</b>  |

### 200 LEVEL RAIN SEMESTER

| Course Code | Course Title                                  | Lecture | Tutorial | Practical | Total Unit |
|-------------|---|---------|----------|-----------|------------|
| BCH 214     | General Biochemistry II                       | 2       | 0        | 3         | 3          |
| BCH 216     | Practical Biochemistry                        | 3       | 0        | 0         | 3          |
| PSG 214     | General Principle of Physiology III           | 2       | 0        | 3         | 2          |
| PSG 216     | Endocrinology & Reproductive Physiology       | 2       | 0        | 3         | 3          |
| BSS 202     | Introduction to Medical Laboratory Science II | 2       | 0        | 0         | 2          |
| CSE 202     | Basic Computer Programming & Applications     | 2       | 0        | 0         | 2          |
| GNS 202     | Economics & Element of Administration         | 1       | 0        | 0         | 1          |
| ANA 214     | Gross Anatomy II                              | 2       | 0        | 3         | 3          |
| ANA 204     | Histology & Body System (Gross Anatomy III)   | 2       | 0        | 3         |            |
|             | <b>TOTAL</b>                                  |         |          |           | <b>22</b>  |

### 300 LEVEL HARMATTAN SEMESTER

| Course Code | Course Title                                   | Lecture | Tutorial | Practical | Total Unit |
|-------------|--|---------|----------|-----------|------------|
| BSS 301     | Medical Lab. Science Ethics                    | 2       | 0        | 0         | 2          |
| BSS 303     | Introduction to Medical Laboratory Science III | 3       | 0        | 1         | 4          |
| BSS 305     | Medical Physics                                | 2       | 0        | 0         | 2          |
| BSS 307     | Counseling Skills                              | 2       | 0        | 0         | 2          |
| PMH 301     | Intro. to Pharmacology                         | 2       | 0        | 3         | 3          |
| PHM 301     | Basic Clinical Chemistry                       | 2       | 0        | 3         | 3          |
| ANA 301     | General Micro biology                          | 2       | 0        | 3         | 3          |
| BSS 309     | Laboratory Posting                             | 0       | 1        | 6         | 3          |
|             | <b>TOTAL</b>                                   |         |          |           | <b>22</b>  |

### 300 LEVEL RAIN SEMESTER

| Course Code | Course Title                            | Lecture | Tutorial | Practical | Total Unit |
|-------------|---|---------|----------|-----------|------------|
| BSS 302     | Laboratory Instrumentation & Techniques | 3       | 0        | 2         | 3          |
| BSS 305     | Laboratory Management & Organisation    | 2       | 0        | 0         | 2          |
| HAE 302     | Fundamental Blood Serology              | 2       | 0        | 3         | 3          |
| HAE 304     | Basic Haematology                       | 2       | 0        | 3         | 3          |
| PTH 302     | General Pathology (Basic Histology)     | 2       | 0        | 3         | 3          |
| CPY 302     | Basic Immunology                        | 1       | 0        | 3         | 2          |
| PHM 302     | Basic Pharmacology &                    | 2       | 0        | 3         | 2          |
| BSS 306     | Laboratory Posting II                   | 0       | 1        | 6         | 3          |
|             | <b>TOTAL</b>                            |         |          |           | <b>21</b>  |

#### 400 LEVEL HARMATTAN SEMESTER

| Course Code  | Course Title  | Lecture | Tutorial | Practical | Total Unit |
|--------------|---|---------|----------|-----------|------------|
| BSS 401      | Medical Parasitology & Entomology                               | 2       | 0        | 3         | 3          |
| BSS 403      | Basic Medical Bacteriology & Mycology                           | 2       | 0        | 3         | 3          |
| BSS 405      | Haematology I   | 2       | 0        | 3         | 3          |
| BSS 407      | Blood Group Serology  | 2       | 0        | 0         | 3          |
| BSS 409      | Chemical Pathology  | 2       | 0        | 3         | 3          |
| BSS 411      | Introduction to Cytology  | 2       | 0        | 0         | 2          |
| BSS 413      | Nucleic Acid Biochemistry & Basic Concepts of Molecular Biology | 2       | 0        | 0         | 2          |
| BSS 415      | Laboratory Posting III  | 0       | 1        | 6         | 3          |
| <b>TOTAL</b> |   |         |          |           | <b>22</b>  |

#### 400 LEVEL RAIN SEMESTER

| Course Code  | Course Title                   | Lecture | Tutorial | Practical | Total Unit |
|--------------|--------------------------------|---------|----------|-----------|------------|
| BSS 402      | Biostatistics                  | 2       | 0        | 0         | 2          |
| BSS 412      | Virology                       | 2       | 0        | 0         | 3          |
| BSS 408      | Histopathology I               | 2       | 0        | 3         | 3          |
| BSS 404      | Biomedical Engineering         | 2       | 0        | 0         | 2          |
| BSS 406      | Biotechnology & Bioinformatics | 2       | 0        | 0         | 2          |
| BSS 410      | Immunology /Immuno-chemistry   | 2       | 0        | 3         | 3          |
| BSS 414      | Laboratory Posting IV          | 0       | I        | 6         | 3          |
| <b>TOTAL</b> |                                |         |          |           | <b>16</b>  |

#### 500 LEVEL HARMATTAN SEMESTER

| Course Code | Course Title  |          | Lecture | Tutorial | Practical | Total Unit |
|-------------|---|----------|---------|----------|-----------|------------|
| BSC 501     | Chemical Pathology II<br>(Carbohydrate, Protein & Lipid Metabolism) | General  | 2       | 0        | 3         | 3          |
| BSC 503     | Chemical Pathology III  | General  | 2       | 0        | 3         | 3          |
| BSC 505     | Clinical Enzymology   | General  | 2       | 0        | 3         | 3          |
| BSC 507     | Nutrition & Clinical Vitamology                                     | General  | 2       | 0        | 0         | 2          |
| BSS 501     | Research Methodology  | General  | 3       | 0        | 0         | 3          |
| BSS 503     | Seminar   | General  | 0       | 2        | 0         | 2          |
| BSS 505     | Laboratory Posting V,   | General  | 0       | 1        | 6         | 3          |
| BSH 501     | Haematology II  | Optional | 2       | 0        | 3         | 3          |
| BSH 503     | Blood group serology I  | Optional | 2       | 0        | 3         | 3          |
| BSH 505     | Blood group serology II   | Optional | 2       | 0        | 3         | 3          |
| BSS 501     | Research methodology  | Optional | 3       | 0        | 0         | 3          |
| 3SS 503     | Seminar   | Optional | 2       | 0        | 0         | 2          |
| 3SS 505     | Laboratory posting V  | Optional | 0       | 1        | 6         | 3          |
| 3SP 501     | Histopathology II   | Optional | 2       | 0        | 3         | 3          |
| 3SP 503     | Histopathology III  | Optional | 2       | 0        | 3         | 3          |
| 3SP 505     | Exfoliative cytology  | Optional | 2       | 0        | 3         | 3          |
| 3SS 506     | Research methodology  | Optional | 3       | 0        | 3         | 3          |
| 3SS 504     | Seminar   | Optional | 0       | 2        | 0         | 2          |
| 3SS 505     | Laboratory posting V  | Optional | 0       | 1        | 6         | 3          |

|         |                                     |          |   |   |   |   |
|---------|-------------------------------------|----------|---|---|---|---|
| BSS 502 | Cytogenetics                        | Optional | 2 | 0 | 3 | 3 |
| BSS 504 | Histopathology<br>techs/embalmment  | Optional | 2 | 0 | 3 | 3 |
| BSS 514 | Museum techniques                   | Optional | 2 | 0 | 3 | 3 |
| BSS 502 | Genetics & Molecular<br>Biology I   | Optional | 2 | 0 | 0 | 2 |
| BSS 506 | Project                             | Optional | 0 | 0 | 8 | 6 |
| BSS 508 | Laboratory posting                  | Optional | 0 | 1 | 6 | 3 |
| BSM 501 | Med. Microbiology II                | Optional | 2 | 0 | 3 | 3 |
| BSM 503 | Med. Parasitology &<br>Epidemiology | Optional | 2 | 0 | 3 | 3 |
| BSM 505 | Public Health<br>Microbiology       | Optional | 2 | 0 | 3 | 2 |
| BSM 507 | Medical Mycology                    | Optional | 2 | 0 | 3 | 3 |
| BSM 501 | Research Methodology                | Optional | 3 | 0 | 0 | 3 |
| BSM 503 | Seminar                             | Optional | 2 | 0 | 0 | 2 |
| BSS 505 | Laboratory Posting V.               | Optional | 0 | 1 | 6 | 1 |

### **KEY**

General: Courses applicable to all 500L students

Optional: Are Discipline dependent Courses

BSH - Haematology & Blood Group Serology Option

BSC - Clinical Chemistry Option

BSM - Medical Microbiology & Parasitology

BSP - Histopathology

### **500 LEVEL RAIN SEMESTER**

| Course<br>Code | Course Title  | Lecture | Tutorial | Practical | Total<br>Unit |
|----------------|---|---------|----------|-----------|---------------|
| BSC 502        | Drug Monitoring, Toxicology<br>& Inborn Error of Metabolism | 2       | 0        | 3         | 3             |
| BSC 504        | Clinical and reproductive<br>Endocrinology                  | 2       | 0        | 3         | 3             |
| BSS 506        | Technique in Clinical Chemistry                             | 2       | 0        | 3         | 3             |
| BSS 502        | Genetics & Molecular Biology                                | 2       | 0        | 0         | 2             |
| BSS 506        | Project   | 0       | 0        | 8         | 6             |
| BSS 508        | Laboratory Posting  | 0       | 1        | 6         | 1             |
| BSH 504        | Specialised Haematological Tech.                            | 2       | 0        | 0         | 3             |
| BSH 514        | Specialised Blood Group<br>Serology Techniques              | 2       | 0        | 3         | 3             |
| BSS 502        | Genetics & molecular biology                                | 2       | 0        | 0         | 2             |
| BSS 506        | Project   | 0       | 0        | 8         | 6             |
| BSS 508        | Laboratory Posting  | 0       | 1        | 6         | 3             |
| BSP 502        | Cytogenetics  | 2       | 0        | 0         | 2             |
| BSM 502        | Medical Virology  | 2       | 0        | 3         | 3             |
| BSM 504        | Pharmaceutical Micro biology<br>& Imicrobial genetics I     | 2       | 0        | 3         | 3             |
| BSS 504        | Laboratory Tech. Microbiology                               | 3       | 0        | 0         | 3             |
| BSS 502        | Genetic & Molecular Biology                                 | 2       | 0        | 0         | 2             |
| BSS 506        | Project   | 0       | 0        | 8         | 6             |
| BSS 508        | Laboratory Posting V.                                       | 0       | 1        | 6         | 3             |
| <b>TOTAL</b>   |   |         |          |           |               |

**(5) DEPARTMENT OF MEDICAL  
MICROBIOLOGY AND PARASITOLOGY  
UNDERGRADUATE PROGRAMMES**

**INTRODUCTION**

The Department of Medical Microbiology and Parasitology is involved in the undergraduate training in Medical Bacteriology, Mycology, Parasitology, Virology and Microbial Immunology of different categories of students in the College of Health Sciences that lead to the award of MBBS (Bachelor of Medicine & Bachelor of Surgery), BMLS (Bachelor of Medical Laboratory Science) and BNSc (Bachelor of Nursing Science) degrees.

**A. REGULATIONS FOR MBBS PROGRAMME**

**1. ADMISSION REQUIREMENT**

As determined by the University Admission Committee

**2. PROGRAMME DURATION**

Three Postings of 8-12 weeks duration each; Introductory Pathology; Block I Pathology and Block II Pathology Posting

**3. PROGRAMME STRUCTURE**

Introductory Pathology  
Block I Pathology  
Block II Pathology

**4. PROGRAMME DESCRIPTIONS**

**INTRODUCTORY PATHOLOGY**

Introduction to Medical Microbiology; Concepts and Principles of Medical Microbiology; Classification of bacteria of medical importance; Classification and properties of medically important parasites; General characteristics and cultivation of viruses; Introduction to mycology and classification of fungi of medical importance; Normal body flora; Bacterial cells structures and functions; Bacteria growth, metabolism and nutrition; Structures and life cycles of intestinal protozoans; Pathogenesis of viral infections; Introduction to bacteria genetics; Immunity to infectious agents & microbial pathogenicity; Laboratory diagnosis of viral infections; Structures and life cycles of blood protozoans; Sterilization and disinfection; Laboratory diagnosis of bacteria and fungi in infections; General properties and classification of helminths; Dermatophytes; Cryptococcus and yeast-like fungi; Togaviruses; Other superficial fungi; Structures and life cycles of cestodes of medical importance; Flaviviruses; Antimicrobial agents and resistance; Orthomyxoviruses; Paramyxoviruses; Structures and life cycles of trematodes of

medical importance; Subcutaneous mycosis; Staphylococci; Streptococci and pneumococci; Seminar; Practical

**BLOCK I PATHOLOGY**

Aerobic Gram Positive bacilli; Anaerobic spore and non spore forming bacilli; Neisseria; Enterobacteriaceae; Haemophilus, Brucella and Bordetella; Vibrio, Campylobacter, Helicobacter and Arcobacter; Spirochaetes; Mycobacteria; Chlamydia; Rickettsiae and Mycoplasma; Systemic Mycosis; Actinomycosis and Nocardiosis; Bacterial Zoonoses; Blood stream infections; Typhoid Fever; Urinary tract infections; Bacteria diarrhoea diseases; Picornaviruses; Herpesviruses; Hepadnaviridae; Retroviruses; Polio & other enteroviruses; Respiratory viruses; Papilloma viruses; Pox and adenoviruses; Viral Zoonoses; Malaria; Other Blood Protozoans; Intestinal Protozoans; Intestinal helminths; Tissue nematodes; Seminar; Practical

**BLOCK II PATHOLOGY**

Bacteria and fungi meningitis; Viral meningo-encephalitis; Parasitic infections of the CNS; Candidiasis; Viral infections of the skin and eyes; Bacteria and fungi ocular infections; Amoebiasis; Histoplasmosis; Infective endocarditis; Leishmaniasis; Viral haemorrhagic fevers; Opportunistic infections; Onchocerciasis and other filariasis; Rabies; Sexually transmitted diseases; HIV/AIDS; Tuberculosis and Leprosy; Schistosomiasis; Hospital acquired/Health care associated infections; Dracontiasis; SARS, influenza and other emerging viral infections; Diphtheria; Larva migrans; Slow virus infections; Bacteria infections of the bones and joints; Organization of microbiology laboratory; Seminar; Practical

**B. REGULATIONS FOR BMLS PROGRAMME**

**1. ADMISSION REQUIREMENT**

As determined by the University Admission Committee

**2. PROGRAMME DURATION**

One semester course

**3. PROGRAMME STRUCTURE**

Course Code: MMP 301  
Description: Medical Microbiology and Parasitology  
Status: Compulsory  
Unit: 3 (L T P)

#### **4. COURSE DESCRIPTIONS**

##### **MMP 301 - MEDICAL MICROBIOLOGY AND PARASITOLOGY**

Scope of microbiology; historical perspectives; classification and nomenclature of micro-organisms; introduction to microbial world; introduction to bacteriology; mycology; virology and parasitology; general properties and structures of bacteria including growth, reproduction, nutritional and environmental requirement; aspects of bacteria metabolism; bacteria in health and disease; antibiosis and chemotherapy; infection and immunity; introduction to laboratory techniques and methods including serology; general properties of virus structure, growth, reproduction, resistance, pathology, purification and propagation; immunity and diagnosis of viral infections; interferon and interference; inclusion bodies; cytopathic effects; viral-host interactions and identifications.

#### **C. REGULATIONS FOR BNSc PROGRAMME**

##### **1. ADMISSION REQUIREMENT**

As determined by the University Admission Committee

##### **2. PROGRAMME DURATION**

One semester course

##### **3. PROGRAMME STRUCTURE**

Course Code: MMP 201

Description: Medical Microbiology and Parasitology

Status: Compulsory

Unit: 3 units

##### **4. COURSE DESCRIPTIONS**

##### **MMP 201 - MEDICAL MICROBIOLOGY AND PARASITOLOGY**

Scope of microbiology; classification and nomenclature of micro-organisms; general properties and structures of bacteria including growth, reproduction, nutritional and environmental requirement; aspects of bacteria metabolism; antibiotics and chemotherapy; infection and immunity; virus structure, growth and reproduction, diagnosis of viral infections; bacteria in health and diseases

#### **POSTGRADUATE PROGRAMME**

##### **INTRODUCTION**

The Department offers a Postgraduate Programme leading to the award of PGD, MSc, MPhil and PhD degrees in Medical Microbiology and Parasitology. The objective of these programmes is to train specialists in Medical Bacteriology and Mycology, Medical Parasitology; and Medical Virology and Immunology.

#### **A. REGULATIONS FOR THE POSTGRADUATE DIPLOMA (PGD) IN MEDICAL MICROBIOLOGY AND PARASITOLOGY**

##### **1. PROGRAMME** Postgraduate Diploma in Medical Microbiology and Parasitology

##### **2. OBJECTIVES** The Programme is intended to impart practical and advanced theoretical knowledge to the following;

- i. Graduates whose basic training is related fields but who are presently employed in medical, pharmaceuticals and other industries
- ii. Graduates who want to make up for the deficiencies in their academic background thus enabling them to pursue higher degree in Medical Microbiology and Parasitology
- iii. Those with AIMLT or its equivalent who want to acquire higher degrees in Microbiology
- iv. Graduates who may wish to acquire considerable knowledge in Microbiological techniques so as to be able to set up diagnostic laboratories.

##### **3. ADMISSION REQUIREMENT**

The programme is designed for candidates who already possess any of the following qualification;

- i. Graduates in Sciences, Food Sciences and Technology, Agriculture and related disciplines acceptable to LAUTECH University Senate
- ii. Graduates in Microbiology, Chemical Pathology, Anatomy, Parasitology and related discipline acceptable to Senate
- iii. Graduates with AIMLT may be considered

##### **4. PROGRAMME DURATION**

Full Time - 12 months minimum

Part Time - 18 months minimum

##### **5. REQUIREMENTS FOR GRADUATION**

Candidates must register for a minimum of 30 units comprising 24 units of courses and 6 units of independent research project

| 6. PROGRAMME STRUCTURE |  |        |   |
|------------------------|--|--------|---|
| COURSE CODE            | DESCRIPTION  | STATUS | UNIT  |
| MMP 700                | EPIDEMIOLOGY, PATHOGENESIS AND PATHOGENICITY OF INFECTIONS<br>The epidemiology, pathogenesis, diagnosis and control of bacteria, fungi and viral infections and diseases   |        | manufacturing systems in epidemiology of zoonoses and antigenic drifts; immunity and immunization schedules; international control of infectious diseases   |
| MMP 701                | GENERAL MICROBIOLOGY<br>Introduction to microbiology; historical aspects; scope of microbiology; characteristics of microorganism; classification, identification and nomenclature of microorganism; growth and reproduction; economic importance of microorganisms                              |        | MMP 705 BASIC IMMUNOLOGY<br>Basic concept of immunology; antigens; antibodies; antigen and antibody interaction; modern techniques in immunohistochemistry; diagnostic application of antigen antibody reactions e.g. Wassermann's test, blood grouping, pregnancy test etc; immune responses; transplantation immunology; histo-compatibility; antigens graft versus host reactions; tumour immunology and hypersensitivity reactions; immune tolerance; immune-prophylaxis; serotyping. |
| MMP 702                | MICROBIOLOGY TECHNIQUES<br>Basic techniques in microbiology; sterilization and disinfection; culturing and sub-culturing; preservation and storage of cultures; inoculation techniques; preparation of culture media; microscopy and spectrophotometer; isolation and identification of organism |        | MMP 706 SEMINAR<br>Oral and written presentation of an approved topics in microbiology  |
| MMP 703                | PHARMACEUTICAL MICROBIOLOGY<br>Production and synthesis of antibiotics and other antimicrobial agents; quality control of pharmaceutical products; antibiotic sensitivity and resistance   |        | MMP 707 GENERAL MEDICAL PARASITOLOGY<br>The nature of parasitism; host-parasite relationship; advantages and disadvantages of parasitism; epidemiology, life cycle, pathogenesis, diagnosis, prevention and control of the following amoebiasis, malaria, coccidioides, human schistosomes, Fasciola, Taenia, intestinal nematodes, guinea worms, Wuchereria, Loa loa, Onchocerca etc; basic concepts of immunology of parasitic infections   |
| MMP 704                | PRINCIPLES OF EPIDEMIOLOGY AND PUBLIC HEALTH<br>Nature and epidemiological investigations; stratum of infections;  |        | MMP 708 RESEARCH PROJECT<br>An original research project involving an investigation into a specific problem in microbiology. The project will require both oral and written presentation to be examined and tested by external examiners approved by Senate.  |
|                        |  |        | MMP 709 RESEARCH METHODS AND STATISTICS<br>Objectives and scope of research; research procedures and material selection; preparation of reports; definition of statistical tests; representation of numerical data; summarization frequency; relative frequency etc; measures of central tendency; measures of dispersion   |
|                        |  |        | MMP 711 BASIC PARASITOLOGY TECHNIQUES<br>Specimen collection in clinical parasitology; procedures for preparation of culture media for ova and protozoa; preservation techniques for examination of intestinal parasites; preparation of thin and thick films for staining; proper use of light, fluorescent and electron microscopes and preparation of photo micrographs; in vitro cultivation of parasites and use of tissue   |

M M P 712 INTRODUCTION TO MEDICAL ENTOMOLOGY

Introduction to medically important arthropods; important parasitological vectors common in the tropics; identification and role of acarines (ticks), mosquitoes, fleas, tabanid flies, *Musca domestica* and other flies, mites, and other true bugs and Cyclops in the transmission of diseases

**B. REGULATIONS FOR THE MASTER OF SCIENCE (Msc) IN MEDICAL MICROBIOLOGY AND PARASITOLOGY**

**1. ADMISSION REQUIREMENT**

The Programme is opened to graduates in Microbiology, Zoology, Biology, Medicine and Veterinary Medicine. Candidates with AIMLS with PGD (CGPA score not less than 3.5 or 60%) in relevant fields may also be considered.

**2. DURATION**

Full-Time - 24 months minimum  
Part-Time - 30 months minimum

**3. COURSE OPTIONS**

i. There shall be three course options: **Bacteriology, Parasitology and Virology**. Candidates are expected to take the entire compulsory courses in the option of their choice

ii. The candidate is expected to carry out research in any of the following areas; Bacteriology/Mycology, Virology/Immunology; and Parasitology. The area of research must be relevant to the course option chosen by the candidate

iii. Candidates admitted into the Programme shall be required to register for not more than 38 course units including the Project

**4. REQUIREMENTS FOR GRADUATION**

To qualify for the award of MSc degree in Medical Microbiology and Parasitology, a candidate must pass all compulsory courses, be credited with a minimum of 35 units and must obtain at least a 50% level pass in the Research Project.

**5. PROGRAMME STRUCTURE**

**COURSE CODE DESCRIPTION**

**STATUS UNIT**

**6. COURSE DESCRIPTIONS**

MMP800 ADVANCED GENERAL MICROBIOLOGY Advanced concept in microbial kingdom organization; bacteria cytology at the detailed function of the various microstructures; bacterial ecology, physiology, growth and metabolism including media and environmental factors involved in their cultivation; biosynthesis of DNA and proteins; modern principles of microbial control; sterilization; bacteria and phage genetics; basic properties of viruses; viral classification, replication, pathogenicity and genetics; antimicrobial and antiviral chemotherapy

**MMP801 GRAM POSITIVE BACTERIOLOGY**  
Epidemiology, pathogenesis and pathogenicity of gram positive bacteria; gram positive cocci staphylococcus and streptococcus, gram positive bacilli (*Corynebacterium* species, *Propionibacterium* species, *Bifidobacterium* species, *Lactobacillus* species, *Bacillus* species, *Clostridium* species, *Listeria monocytogenes*

**MMP802 GRAM NEGATIVE BACTERIOLOGY**  
Epidemiology, pathogenesis and pathogenicity of gram negative bacteria; gram negative cocci - *Neisseria* species, *Moraxella* species and *Veillonella* species; gram negative bacilli Enterobacteriaceae, *Pseudomonas* species, Vibrios and related organisms; small bacilli *Haemophilus* species, *Bordetella* species, *Brucella* species, *Pasteurella* species, *Bacteroides* and *Prevotella* species, *Yersinia* species, acid fast bacilli (Mycobacteria), branching bacteria *Streptomyces* species

**MMP803 A D V A N C E D M E D I C A L HELMINTHOLOGY**

Classification, epidemiology, pathogenesis and pathogenicity of helminths of medical importance; intestinal helminths, filariasis including onchocerciasis; dracunculiasis; taeniasis; echinococcosis; schistosomiasis; paragonimiasis, fascioliasis

**MMP804 A D V A N C E D M E D I C A L PROTOZOOLGY**

Classification, epidemiology, pathogenesis and pathogenicity of protozoa of medical importance; protozoa of blood, alimentary tract and genitalia; leishmaniasis; trypanosomiasis; toxoplasmosis; malaria

**MMP805 ARBOVIROLOGY**

Aetiology, natural history, pathogenesis and pathology of major arboviruses of public health importance including Chickungunya, O'nyong nyong, Igbo-ora, Ross river, Semliki forest, Sindbis, Equine encephalitis, Yellow fever, Dengue, St Louis encephalitis, Japanese B encephalitis, West Nile, Zika, Uganda S, Kotokan, Bovine encephalitis fever, Chandipura, Rift valley fever, Congo-crimean haemorrhagic fever, Tick-borne encephalitis, Orbiviruses including Orungo and Colorado tick viruses

**MMP806 ADVANCED IMMUNOLOGY AND IMMUNE RESPONSE**

Structure, synthesis and characterization of immunoglobulins; immunogenicity and antigenicity; antigen-antibody interactions; complement systems category and cooperation of cells involved in immune response; aspects of immune response, tolerance, hypersensitivity; immune lymphokines systemic defence against infectious agents; immunization; vaccine quality and control; immunological tests; monoclonal antibodies; current topics in immunology

**MMP807 ADVANCED MEDICAL VIROLOGY I**

Major characteristics of RNA viruses; pathogenesis, pathology, diagnosis and epidemiology of infections caused by the following families of viruses; Togaviridae; Flaviviridae; Bunyaviridae; Rhabdoviridae; Coronaviridae; Orthomyxoviridae; Paramyxoviridae; Arenaviridae, Filoviridae, Retroviridae, Caliciviridae, Astroviridae, Reoviridae

**MMP808 ADVANCED MEDICAL VIROLOGY II**

Major characteristics of DNA viruses; pathogenesis, pathology, diagnosis and epidemiology of infections caused by members of the following families of DNA viruses; Adenoviridae; Herpesviridae; Papovaviridae; Parvoviridae; Hepadnaviridae; Poxviridae

**MMP809 SYSTEMIC MICROBIOLOGY**

Diseases of the organ systems; central nervous system; respiratory system; gastrointestinal system; genitor-urinary system; skin and soft tissue; heart; liver; acquired immunodeficiency syndrome (AIDS)

**MMP810 OTHER BACTERIA**

Epidemiology, pathogenesis and pathogenicity of Rickettsiae and related bacteria (Coxiella, Bartonella); Chlamydia; Actinomyces; Nocardia; Spirochaetes; Mycoplasma and Ureaplasma; *Calymmatobacterium granulomatis*; *Streptobacillus moniliformis*; Afipia; *Gardnerella vaginalis*

**MMP 811 MEDICAL MYCOLOGY**

**MMP 812 ADVANCED MEDICAL ENTOMOLOGY**

Introduction to medically important arthropods; important parasitological vectors common in the tropics; identification and role of acarines (ticks), mosquitoes; fleas and tabanid flies; *Musca domestica*; and other true bugs and Cyclops in the transmission of diseases.

**MMP 813 CLINICAL BACTERIOLOGY  
AND MYCOLOGY**

Design of microbiology laboratory; handling, collection and transport of clinical specimens; culture of specimens from food, water, blood, urine, stool, sputum, cerebrospinal fluid and other body fluids; principle of antimicrobial sensitivity testing; sero-diagnosis and bioassay; control of hospital infections; laboratory diagnosis of fungal infections; isolation, identification and serology

**MMP 814 CLINICAL PARASITOLOGY**

Specimen collection in clinical parasitology; procedures for preparation of culture media for eggs and protozoa; preservation techniques for examination of intestinal parasites; preparation of thin and thick films for staining; proper use of light, fluorescent and electron microscopes and preparation of photomicrographs; in vitro cultivation of parasites and use of tissue culture techniques; production and purification of parasite antigens from culture; parasite material immune-diagnostic techniques including serology; and the use of histological techniques in the study of parasites

**MMP 815 CLINICAL VIROLOGY**

Collection and handling of clinical specimens for viral diagnosis; methods of cultivation of viruses in animal fertile eggs and tissue culture; culture media and maintenance of primary and continuous cell cultures, estimation of LD<sub>50</sub> etc; antibody detection in clinical specimens by complement fixation test, ELISA and immunofluorescence, Western blot etc; molecular methods of viral diagnosis polymerase chain reaction, use of DNA probes etc

**MMP 816 RESEARCH METHODS AND SEMINAR  
IN MICROBIOLOGY**

Retrospective and prospective serological surveys; field surveys in

parasitology; statistical analysis of data; methods of investigation of ecology of arboviruses; methods of characterization of infectious agents; review of journal articles

**MMP 817 MOLECULAR TECHNIQUES**

Introduction to molecular biology with focus on the techniques used to isolate, identify, modify and analyze three key molecules DNA, RNA and proteins; explanation of the concept of PCR, cloning vector, manipulation and isolation of genomic DNA and RNA, restriction analysis, DNA sequencing, RT-PCR, micro-arrays and gene chip; protein analysis, Southern blotting, Northern blotting, Western blotting, proteomics, protein separation techniques

**MMP 818 BIOSTATISTICS**

Samples and populations; variable in biology; derived variable and frequency distributions; descriptive statistics; introduction to probability distributions binomial and poison; normal probability distribution, estimation and hypothesis testing; introduction to analysis of variance analysis of variance single classification tested and two way analysis; regression, correlation and contingency tables

**MMP 819 TROPICAL ECOLOGY AND HUMAN  
HEALTH**

Human health problems in tropical countries with emphasis on environment sanitation in the communities

**MMP 820 RESEARCH PROJECT**

Original research project on an approved topic

**MMP 821 EPIDEMIOLOGY**

Introduction to epidemiology; definitions of vital parameters; description of disease patterns communicable and non-communicable; natural history of diseases distribution, aetiology, risk factor, control; morbidity and mortality; population studies; census designing and use of prospective and retrospective studies; controlled field trials with emphasis on medical surveys and surveillance

**C. REGULATIONS FOR THE MASTER OF PHILOSOPHY (MPhil) IN MEDICAL MICROBIOLOGY AND PARASITOLOGY**

1. Admission to the MPhil Programme in Medical Microbiology and Parasitology shall be open to:
  - i. Candidates who have attained a 50% level pass in the course examination for MSc degree in Medical Microbiology and Parasitology at Ladoke Akintola University of Technology (LAUTECH) and at least a 60% pass level in the Project.
  - ii. Candidates who possess a MSc degree in Medical Microbiology and Parasitology or related discipline from other Universities whose degree are recognized by the Senate of LAUTECH, each case being considered on his/her own merit
2. Candidates admitted to the MPhil degree Programme in Medical Microbiology and Parasitology may be required to take relevant courses as recommended by the Department and such candidates are expected to sit and pass any prescribed examinations in the recommended courses.
3. Candidates for MPhil degree in Medical Microbiology and Parasitology are required to carry out original research. The research work shall commence in the first year of registration
4. The areas of specialization available in the Department are; Bacteriology/Mycology, Virology/Immunology and Parasitology
5. The candidate, the supervisor(s) and the Head of Department shall agree upon the areas of specialization
6. The degree of MPhil in Medical Microbiology and Parasitology shall be awarded on the basis of a dissertation resulting from an original and independent research
7. Part-Time students will be considered each on his/her own merit

**D. REGULATIONS FOR THE DOCTOR OF PHILOSOPHY (PhD) IN MEDICAL MICROBIOLOGY AND PARASITOLOGY**

1. The PhD Programme is opened to candidates having MPhil in Medical Microbiology and Parasitology or MSc degree of LAUTECH with CGPA score of not less than 4.00 or 60% weighted average in Medical Microbiology and Parasitology and at least 60% pass level in MSc. research.
2. Candidates for the MPhil or MSc degree in Medical Microbiology and Parasitology of LAUTECH who satisfied all the course requirements for the MPhil degree and have been permitted by the University Senate of LAUTECH to upgrade their registration.
3. Candidates with MPhil or MSc degree in Medical Microbiology or related fields from other Universities awarding degree recognized by the Senate of LAUTECH, the performance of such candidates must be judged to be adequate for PhD course, and such candidates must be required to take any relevant courses that the departmental may prescribe.
4. Candidates admitted to the PhD Programme in Medical Microbiology and Parasitology may be required to take relevant courses as recommended by the Department and such candidates are expected to sit and pass any prescribed examination in the recommended courses.
5. Candidates for the PhD degree in Medical Microbiology and Parasitology shall be required to carry out original research.
6. The areas of specialization available in the Department are; Bacteriology/Mycology, Virology/Immunology and Parasitology.
7. The areas of specialization shall be agreed upon by the candidate, the supervisor(s) and the Head of Department
8. The degree of PhD in Medical Microbiology and Parasitology shall be awarded on the basis of a thesis / dissertation embodying original contribution to knowledge and other requirements stipulated by the School of Postgraduate Studies
9. Part-Time students will be considered on his/her merit

(6) **DEPARTMENT OF  
MORBID ANATOMY AND HISTOPATHOLOGY**

**CURRICULUM FOR THE MBBS PART II PROGRAMME  
IN MORBID ANATOMY AND HISTOPATHOLOGY**

**1. INTRODUCTION**

Morbid anatomy and Histopathology is a bridging discipline between the Basic Medical Sciences and Clinical Medicine, involving the integration of both basic science and clinical practice devoted to the study of structural and functional changes in cells, tissues and organs that underlie disease. It is concerned with the aetiology, pathogenesis, morphologic changes, functional derangements and clinical manifestations of diseases.

The study of Morbid Anatomy and Histopathology is divided into:

- i. **GENERAL PATHOLOGY:** concerned with the basic reactions of cells and tissues to abnormal stimuli that underlie various disease processes.
- ii. **SYSTEMIC PATHOLOGY:** concerned with the specific responses of specialized organs and tissues to well-defined stimuli.
- iii. **FORENSIC PATHOLOGY:** concerned with the medico-legal aspects of pathology and medical practice in general especially within the Nigerian context.

Morbid anatomy and Histopathology is expected to be taught for a total of twenty-four (24) weeks within the first clinical year according to the Medical and Dental Council of Nigeria/Nigerian Universities Commission guidelines. This will be run in three postings each of 8 weeks duration.

The first posting shall be the INTRODUCTORY POSTING during which the principles of General Pathology shall be taught. The students will also have practical demonstrations of the diseases that exemplify these general principles during their practical sessions.

The second posting shall be the BLOCK I POSTING during which the students shall be given lectures in Systemic Pathology. The students shall also have Practical sessions in Histopathology and Gross Pathology during this second posting.

The third posting shall be the BLOCK II POSTING. During this posting, the students shall complete all outstanding lectures in systemic and forensic pathology. They shall also have seminar presentations and revision of previously taught subjects. The students shall also have adequate exposure to routine hospital histopathology and autopsy practice (students are expected to attend autopsy and autopsy demonstration sessions). There shall also be a revision of previous practical sessions. This Block II posting will ultimately lead into the Part II MBBS examination after a 2 week lecture free period.

**2. GENERAL PATHOLOGY**

**2.1. General objectives**

It is expected that medical students at the end of the course would have understood the basic structure of the cell with particular emphasis on ultrastructural components and molecules. They shall be expected to know and understand the various injurious stimuli that cause disease and the basic reactions and responses of cells and tissues to these stimuli. They should also be able to correlate these reactions with generalized changes expected in body organs and how these relate to the clinical symptoms and signs seen in patients. Conscious effort will be made to incorporate the knowledge gained from the study of anatomy, histology, embryology, physiology and biochemistry into the understanding of this course.

**2.2. Specific objectives**

At the end of the course each medical student should be able to understand:

- I. The evolution of the concept of disease as well as the role

- of the autopsy and other investigative modalities in pathology practice.
- ii. The structure of the cell with emphasis on the cell's ultrastructure, cellular homeostasis, interactions and signaling mechanisms.
- iii. The structure and organization of the extracellular matrix and its role in the body's reaction to injury.
- iv. The mechanism of cellular reactions to various forms of injury as well as the outcomes of those reactions.
- v. Acute and chronic inflammation including wound healing and how these underlie various diseases in the human body.
- vi. The structure and function of blood vessels and how these mediate circulatory disorders
- vii. The structure and organization of the immune system and the mechanisms of congenital and acquired immune mediated disease.
- viii. The basic concepts of genetics and the role of genetics in human diseases.
- ix. The basic concepts of neoplasia as well as the molecular biology of tumour development and progression.
- x. The basic concepts of infectious diseases
- xi. The basic concepts of congenital malformations

### **2.3 Learning outcome measures**

Learning outcomes shall be tested at periodic post lecture assessments as well as through discussions at lectures, tutorials and seminars. There shall also be an end of course assessment at the end of the first phase of the posting.

### **2.4 Methods of instruction**

These shall include:

- i. Formal lectures using Microsoft power-point presentations projected through a multi-media projector.
- ii. Tutorial group discussions

### **2.5 Course Content**

- i. **Introduction to Pathology:** Introduction to Anatomical Pathology; The concept of Disease, The Autopsy; Normal cell structure; Cellular Homeostasis; Extracellular Matrix; Cellular Aging; Mechanism of Cellular Growth and Differentiation; The Cell Cycle.
- ii. **Cellular Reaction to Injury:** Cellular adaptation of growth and differentiation; Cellular Injury and Cell Death; Necrosis; Apoptosis; Pathological Calcification; Intracellular Accumulation.
- iii. **The Inflammatory Response:** Nature & Causes; Vascular & Cellular events of acute inflammation; Chemical mediators of Acute Inflammation; Chronic Inflammation: Nature, Aetiology, Types; Wound Healing & Repair; Mechanisms, Modulators, Complications, Types.
- iv. **Haemodynamic Disorders:** Oedema; Hyperaemia & Congestion; Thrombosis & Embolism; Infarction; Shock; DIC.
- v. **Immune Disorders:** Organization & Normal Function of the Immune System; Hypersensitivity Reactions; Transplant Rejection; Mechanisms of Immune Tolerance; Autoimmune diseases; Nature; Mechanisms; Connective Tissue Diseases; Immune Deficiency Syndromes; The Pathology of AIDS; Amyloidosis: Nature, Classification, Pathogenesis, Morphology.
- vi. **Genetic Disorders:** Basis of Inheritance: Chromosome & DNA Structure, Genes, Mutations; Mendelian Disorders; Karyotype; Cytogenetic disorders; Single

Gene Disorders with non-classic inheritance.

- vii. **Neoplasia:** Definition, Nomenclature & Characteristics; Aetiology & Epidemiology; Molecular Basis of Carcinogenesis; Biology of Tumour Growth and Metastasis; Carcinogenic Agents and Tumour Development; Anti-tumour Immunity; Host tumour effects; Diagnosis of Cancer.
- viii. **Introduction to Tropical Pathology:** Introduction to Infectious Disorders: Resistance, Routes of Entry, Host Response & Tissue Damage. Malaria; Hyper-Immune Malaria Splenomegaly; Common Bacterial, Protozoal, and Filarial Infections. Schistosomiasis; Sickle-cell Anaemia
- ix. **Introduction to Neonatal Pathology;** Cellular and Genetic Events in Normal Human Development. Aetiology and Pathogenesis of Congenital Disorders. Congenital anomalies.

### **3. SYSTEMIC PATHOLOGY**

#### **3.1. General objectives**

It is expected that medical students, at the end of this course, should be familiar with the epidemiology, aetiology and pathogenesis, gross and microscopic features of various diseases in the different organ systems with particular emphasis given to the more common disorders especially in our immediate environment. The application of the principles learnt in general pathology with respect to these diseases shall be emphasized. It is also expected that the students would have understood the principles, methods, practice and application of the autopsy to clinical medicine. It is also expected that the students would be familiar with the use of

histopathological and cytological methods in routine diagnosis within the teaching hospital (Ladoke Akintola University of Technology Teaching Hospital). Moreover, it is expected that the students should be familiar with the gross morphological and histopathological features of common diseases in this environment.

#### **3.2. Specific objectives**

At the end of the course, medical students should be:

- i. Familiar with the classification of diseases in the various organ systems of the body.
- ii. Familiar with the aetiopathogenesis (including risk factors) of major diseases affecting the various organ systems of the body
- iii. Familiar with the pathological features of major diseases affecting the various organ systems of the body and relate these with the clinical features and prognosis of these diseases.
- iv. Able to describe the gross morphological features of selected diseases.
- v. Able to describe the microscopic features of selected diseases.
- vi. Familiar with the principles guiding routine hospital and coroner autopsy procedures. They should have witnessed at least ten (10) autopsy procedures, assisted in at least five (5) and written up a full report on at least two (2) of the cases seen.

#### **3.3. Learning outcome measures**

These shall be through periodic post lecture assessments as well as through discussions at lectures, tutorials and seminars.

There shall also be an End of Posting assessment (including practical examination) at the end of the posting.

There shall be an End of Course assessment at the end of the 2nd posting.

### **3.4. Methods of instruction**

These shall include:

- i. Formal lectures using Microsoft power-point presentation projected through a multi-media projector.
- ii. Organ demonstration using museum pots.
- iii. Histopathology practical sessions involving slide demonstrations and microscopy sessions.
- iv. Autopsy demonstrations at the teaching hospital (LAUTECH Teaching Hospital).
- v. Rotation through the routine laboratory at the LAUTECH Teaching Hospital
- vi. Seminars
- vii. Tutorial group discussions.

### **3.5. Course content**

#### **I. DISEASES OF THE FEMALE GENITAL TRACT:**

Diseases of the Vulva; Diseases of the Vagina; Disorders of the Cervix; Diseases of the Body of the Uterus and Endometrium; Disorders of the Fallopian Tubes; Disorders of the Ovaries; Gestational and Placental Disorders

#### **ii. DISEASES OF THE CENTRAL NERVOUS SYSTEM:**

Developmental malformations; trauma; Cerebrovascular disorders; the Meningoencephalitides; Prion diseases; Demyelinating Diseases, Degenerative diseases; Tumours on the CNS.

#### **III. DISEASES OF THE GASTROINTESTINAL TRACT:**

Congenital anomalies of the oesophagus and stomach; oesophageal motility disorders; oesophagitis; oesophageal varices; Gastritis; Peptic ulcer disease; Tumours of the oesophagus & stomach; Enterocolitis; Malabsorption syndromes; Idiopathic inflammatory bowel disease; Vascular disorders and Intestinal

obstruction; Diverticular disease; Tumours of the small and large Intestines; Disorders of the Appendix.

**iv. LYMPHORETICULAR PATHOLOGY:** Anatomy of the Lymph Node; Reactive Disorders of Lymph Nodes; Lymphomas; Splenic Disorders; Disorders of the Thymus.

**v. DISEASES OF THE HEAD AND NECK:** Disorders of Odontogenic Structures; Disorders of the Oral Cavity; Diseases of the Upper Airways and Neck; Salivary Gland Disorders.

**vi. PATHOLOGY OF THE LUNGS:** Congenital Anomalies; Lung Collapse; Acute Lung Injury; The Pneumonias; Lung Abscess; Tuberculosis; Obstructive Pulmonary Diseases; Diffuse Interstitial Diseases; Diseases of Vascular origin; Tumours of the Lungs; Diseases of the Pleura.

**vii. PATHOLOGY OF THE ENDOCRINE SYSTEM:** Hypo- & Hyperpituitarism, Pituitary Gland Tumours; Craniopharyngioma; Congenital Thyroid Lesions; Hypo- & Hyperthyroidism; Graves Disease; Thyroiditis; Thyroid Neoplasms; Parathyroid Disorders; Diabetes Mellitus; Insulinomas; Zollinger-Ellison syndrome; Disorders of the Adrenal Cortex & Medulla; MEN Syndromes.

**viii. DISEASES OF BLOOD VESSELS:** Normal blood vessel anatomy and physiology; Atherosclerosis; Vascular Aneurysms and Dissection; Inflammatory Disorders of Blood Vessels; Tumours of Blood Vessels;

**IX. CARDIOVASCULAR PATHOLOGY:** Hypertension & Hypertensive Heart Disease; Congenital, Ischaemic, Rheumatic & other Valvular Heart Diseases; Infective Endocarditis; Myocardial Disorders; Pericardial Diseases.

**X. PATHOLOGY OF THE LIVER:** Normal Anatomy, Physiology and Functions of the Liver; Acute and Chronic Hepatitis; Autoimmune Hepatitis; Alcoholic Liver Disease; Metabolic Liver Disease; Circulatory Disorders; Liver Neoplasms.

**XI. BILIARY TRACT DISORDERS:** Congenital Anomalies of the Gallbladder; Gallstones; Cholecystitis; Intra and Extra-hepatic Biliary Tract Disorders. Inflammatory and Neoplastic Diseases of the Exocrine Pancreas.

**xii. DISEASES OF THE LOWER URINARY TRACT:** Disorders of the Ureters; Diseases of the Urinary Bladder; Urethral Diseases.

**xiii. DISEASES OF THE MALE GENITAL TRACT:** Disorders of the Penis; Disorders of the Testis and Epididymis; Prostatitis; Benign Prostatic Hyperplasia; Prostatic Adenocarcinoma.

**xiv. RENAL PATHOLOGY:** Congenital Anomalies; Cystic Renal Diseases; Glomerulonephritides; Tubulo-Intestinal Disorders; Vascular Disorders of the Kidney; Obstructive Uropathy/Urolithiasis; Tumours of the Kidney.

**xv. PATHOLOGY OF THE BREAST:** Developmental Disorders; Inflammatory Disorders; Benign Proliferative and Non-proliferative Breast Lesions;

Breast Carcinoma; Benign and Malignant Stromal Tumours; The Male Breast.

**xvi. BONE, JOINT AND SOFT TISSUE DISEASES:** Developmental disorders of Bone, Fractures, Infectious and Neoplastic Disorders of Bone; Arthropathies; Common Soft Tissue Tumours.

**xvii. DISEASES OF SKIN:** Infectious Disorders including Leprosy, Buruli Ulcers, Deep Mycosis, Acne etc; Inflammatory Dermatoses, Tumours of the Epidermis and Dermis.

#### **4. FORENSIC PATHOLOGY**

This course shall be integrated into the second phase of the pathology posting during the block II posting together with systemic pathology seminars, revision and practical sessions. Therefore, the learning outcome measures and methods of instruction shall be the same as for systemic pathology.

##### **4.1. General Objectives**

The students are expected to be familiar with the laws governing medical practice especially in Nigeria. They should also be familiar with:

- i. The legal responsibility of correct death certification
- ii. Deaths referred to the Coroner
- iii. Types of wounds especially in road traffic accidents, firearms injuries
- iv. The features of drowning, hanging, strangulation and suffocation
- v. Homicidal, suicidal and accidental deaths.
- vi. The conduct of basic medico-legal examination in simple medico-legal cases
- vii. Patient confidentiality and medical ethics.

#### **4.2. Course outline**

- i. Medicolegal Systems; Medical Examination/Coroner's Cases
- ii. Medical and Dental Council of Nigeria
- iii. Medical Defense Unions
- iv. The Doctor at the Scene of Death
- v. Signs of Death; Estimation of Time of Death
- vi. Identification
- vii. Sudden and Unexpected Death
- viii. Investigating Deaths due to Poison
- ix. Types of Wounds
- x. Road Traffic Accidents
- xi. Firearms Wounds
- xii. Asphyxia
- xiii. Drowning
- xiv. Burns, Electrocution, Deaths from Lightning
- xv. Consent, Professional Secrecy, Medical Negligence
- xvi. Writing Medicolegal Reports; The Doctor in Court

### **5. SPECIFIC METHODS OF EXAMINATION**

#### **5.1. Attendance at Lectures and Practical sessions**

This is compulsory. A student shall be required to have 75% overall attendance before he/she can be allowed to write the Part II Professional Examination in Pathology. This will constitute 5% of the overall assessment for the Part II examination. The practical manuals shall also be assessed for student participation during the posting period.

#### **5.2. In-course Assessment/End of Posting Examination**

This shall be done at specified periods during the course as outlined in previous sections and will constitute 25% of the overall assessment for the Part II MBBS examination.

#### **5.3. Part II MBBS Examination**

This shall constitute 70% of the overall assessment for the course. It shall consist of three parts: Written Examination, Practical Examination and Oral Examination.

The written examination shall be in two (2) parts: Paper I (MCQ) and Paper II (Essay).

The practical examination shall be in the form of Objective Structural Clinical Examination (OSCE).

#### **5.4. Allocation of Marks for the Part II MBBS Examination**

Allocation of marks, after conversion from the original scores, for the various constituent parts of the examination shall be as follows:

|                       |          |
|-----------------------|----------|
| MCQ                   | 25 marks |
| Essay                 | 30 marks |
| Practicals            | 25 marks |
| Oral examination      | 25 marks |
| Continuous Assessment | 25 marks |
| Attendance            | 5 marks  |

The pass mark is set at an overall score of 50%.

## (7) **DEPARTMENT OF CHEMICAL PATHOLOGY**

### 1. AIMS AND OBJECTIVES

The course in Clinical Chemistry is designed to highlight the central role which abnormalities of biochemical functions of cells, tissues and organs play in the diagnosis, management and prognosis of disease states and these abnormalities of biochemical functions may be recognized by measurements of components of biological fluids, blood urine, cerebrospinal fluid, secretions, excretions of tissues or organs.

The course in nutrition is aimed at exposing the medical students to the pivotal role of adequate and appropriate nutrition in virtually all health conditions and how in particular traditional beliefs, custom and habits in developing countries like Nigeria affects the growth and development of children. The course would serve to bridge the biochemistry course in basic nutrition with the exposure to nutrition in Pediatrics, Medicine and surgery by emphasizing the pathological aspects. The course in immunology is aimed at introducing the student to basic concepts of immunology with emphasis on the roles of immunological processes in infections- (in prevention and protection), in malnutrition, in autoimmune disorders and in malignancies.

### 2. UNDERGRADUATE PROGRAMME:

The scope of subjects to be covered during the undergraduate medical course of training is extensive. It includes both theoretical and practical aspects of (a) Clinical Chemistry (b) Human Nutrition and (c) Immunology.

### 3. INSTRUCTIONAL METHOD:

By lectures, tutorial, seminars, demonstrations, self instructional packages, practical and guided reading assignments.

### 4. COURSE CONTENTS

#### (a) INTRODUCTORY LECTURES

The role of Laboratories in Clinical patients care.  
Collection and Preservation of Samples  
Introduction to Diagnostic Biochemical Tests.

The Concepts of Reference values

Factors influencing Interpretation of Test Results.

Introduction of Diagnostic Immunological Tests

Urinalysis in Clinical Medicine I & II

Quality Assurance

Precautions & Laboratory Hazards

#### (b) BLOCK POSTING

Disorders of Calcium and Phosphate

The liver in Health and Disease

Assessment of Liver Functions

Fluid and Electrolyte Balance

Acid Base Balance

Biochemical Assessment of Renal Function

Clinical Nutrition Introduction Concepts

Disorders of Carbohydrate Metabolism

Disorder of Lipid Metabolism

Clinical Toxicology, Introductory Concepts

Assessment of Toxic Substances in blood

Disorders of Endocrine System

System Assessment of Endocrine Function

Investigation of Gastric Function

Disorders of Protein Metabolism

Introductory Concepts of Immunology

Antigens (Immunogens and the Immune Responses)

Fate of Antigens

The Lymphoid System

Cells of the Immune Response

Immunodeficiency Diseases

Immune Tolerance, Auto-immunity and Immunosuppression

Hypersensitivity Reactions

The Major Histocompatibility System

Transplantation and Immunological Basis of Transplant

Rejection Reaction

Tumour Immunology

Clinical Pathology of CNS and CSF

Revision

End of Posting Test

**(c) BLOCK II POSTING**

Acid Base Balance  
Fluid & Electrolyte  
Disorders of Carbohydrate Metabolism  
Calcium/Phosphate Metabolism  
Molecular Biology in Clinical Chemistry  
Test of Renal Functions  
Investigation of gastric & Intestinal Function  
Plasma Proteins in Health & Disease  
Plasma Enzyme I  
Plasma Enzyme II  
Liver Function Tests  
Nutritional Disorders I  
Nutritional Disorders II  
Disorders of Lipid Metabolism  
Disorders of Purine Metabolism  
Diagnostic Immunological Tests  
Chemical Pathology of Paediatric and Geriatrics  
Chemical Pathology of Pregnancy  
Revision  
Test

**(d) PRACTICALS**

- (i) Demonstration:- specimen collection - different types of sample tubes, sample identification, separation of plasma or serum, collection and preservation of urine specimens.
- (ii) Demonstration: Determination of blood gas and blood PH"
- (iii) Determination of Glucose:
  - (a) Glucose estimation in blood by the glucose oxidation method, (*a specified method*)
  - (b) Glucose estimation in the same blood by the ferricyanide reduction method (*a non-specific method*)
  - (c) Strip test for glucose in blood (*semi-quantitative method*)
- (iv) Plotting of oral glucose tolerance test curves
- (v) Uses of Metabolic Research Ward ..
- (vi) Urinalysis: determination of urine specific gravity, osmolarity and qualitative test for protein, glucose and reducing substances, ketones, bilirubin, urobilinogen and blood.
- (vii) Haemoglobin and haemoglobin derivatives in urine spectroscopy of haemoglobin and its derivatives in blood
- viii. Occult blood in faeces
- ix. Different methods of protein estimation
- x. Electrophoresis of plasma protein, haemoglobins and Isoenzymes
- xi. Demonstration
  - (i) Column chromatography
  - (ii) Paper and thin layer chromatography sugars and amino-acids in urine.
- xii. Demonstration: Determination of serum enzymes.
- xiii. Demonstration: Radioimmunoassay of hormones in blood.
- xiv. Demonstration: Estimation of 17 -oxosteroid in urine.
- xv. Biochemical analysis of cerebrospinal fluids (CSF)
- xvi. Demonstration: Methods of vitamin analysis in blood

## **POSTGRADUATE PROGRAMMES**

### **INTRODUCTION**

Chemical Pathology (Clinical Biochemistry) is the meeting point of Raptly advancing disciplines of which Analytical Chemistry, Biochemistry, Biomedical Sciences and Clinical Medicine are the most important. Chemical Pathology provides students with fundamental knowledge adequate for the diagnosis, treatment, prevention and understanding of the metabolic basis of diseases in man and animals. The course content will also provide skills for the interpretation of laboratory results and management of diseases.

### **1. AIMS AND OBJECTIVES OF THE POSTGRADUATE COURSES IN THE DEPARTMENT OF CHEMICAL PATHOLOGY**

The main objectives of these programmes are to retain

- (a) Graduates in the field of Medicine and Life Science who are interested and capable of pursuing academic careers in teaching and/or research in the Universities and related tertiary institutions.
- (b) High level manpower required to take charge of Clinical Biochemistry and Immunology Laboratory in hospitals.

### **2. THE PROGRAMMES OFFERED**

M.Sc., MPhil/PhD, PhD  
Master of Science (M.Sc),  
Master of Philosophy leading to Doctor of Philosophy,  
Doctor of Philosophy (direct)

### **3. EIGHTEEN MONTHS M.SC. COURSE**

#### **3.1 Entry Requirements**

- (a) Candidates for admission to the M.Sc. degree programme in addition to the basic University admission requirements, shall normally be holders of good Bachelor of Science degree in Biochemistry, Physiology, Bachelor of Medical Laboratory Science, Bachelor degree in Medicine, Veterinary Medicine, Dental Surgery and other related disciplines of this University or other

- (b) Universities recognized by the University Senate.  
Candidates with a Fellowship of the Medical Laboratory Science Council of Nigeria are also eligible to apply.

#### **3.2 Duration and Nature of Study**

The course which shall normally last for eighteen months on full time registration or thirty-six months on part time registration will consist of lectures, seminars, laboratory work and a research project.

#### **3.3 Candidates must Register and Pass Courses not less than 22 units**

including project and all compulsory courses. There shall be no resist examinations in any of the courses. Student who fails in any compulsory required course shall re-register for the course or the project and be examined at the appropriate time.

#### **3.4**

A candidate's registration shall normally lapse if he/she has not fulfilled the requirements for the award of the degree after thirty-six months of full time or seventy-two months of part-time registration.

All candidates must be required to take and pass the following compulsory courses CPY 701, CPY 703, CPY 711, CY 741 and CPY 712. Candidates must also take and pass courses relate to their project area e.g. A candidate with immunology project must take and pass CPY 731 and CPY 732 along with the compulsory courses. Other candidates should make up their required units by taking and passing some of the other relevant elective courses.

#### **3.6 Scheme of Examination**

Each course will be assessed by written examination (Theory paper) and an MCQ paper. Each of the courses, CPY 703 and CPY 732 will be examined by continuous assessment of written reports and seminar presentation. Projects shall be examined orally. The pass mark for all courses shall be 40%. The degree shall be classified based on calculated weighted average for the passed courses as follows:

- 40-49 M.Sc. Terminal
- 50-54.9 Can proceed to M.Phil
- 55-59.9 Can proceed to M.Phil/Ph.D
- 60 and above can proceed to Ph.D

## COURSE CONTENTS

| Course Code | Title & Description  | Units | Remark |
|-------------|--|-------|--------|
| CPY 701     | <b>INTRODUCTORY CHEMICAL PATHOLOGY</b><br><br>Fundamentals of Chemical pathology concepts of effective Clinical Biochemistry service, the role of biochemical investigations in Chemical Medicine, base balance, Fluid and electrolyte balance liver function tests, GIT, Function tests, Pathophysiology of disease of the endocrine system, disorders of metabolism of the macronutrients i.e. proteins, carbohydrates, lipids, the nucleic acids, gout. The concept of reference range, interpretation of laboratory reports, errors in laboratory measurement, quality assurance quality control, disorders of calcium, Phosphate and magnesium metabolism, bone disease etc. The plasma proteins, Haematology biochemical aspects of Haematology  | 4     | C      |
| CPY 702     | <b>CLINICAL ENZYMOLOGY</b><br><br>Biocatalysts, enzyme kinetics and nomenclature. The role of enzyme in clinical diagnosis, serum enzymes in disease. Isoenzymes, enzymes of diagnostic importance. Methods in enzymology enzymes in other body fluids and tissues. Use of enzymes e.g. Diagnosis of myocardial infarction. Diagnosis of Liver Disease. Diagnosis of Bone Disease. Diagnosis of Acute pancreatitis. Diagnosis of muscle disorders. Investigation of genetic disorders etc.   | 2     | E      |
| CPY703      | <b>CHEMICAL PATHOLOGY LABORATORY ETHOS SEMINARS</b><br><br>Introduction to the clinical biochemistry laboratory. Uses of the Chemical Pathology Laboratory. Principles and applications of Methods used in clinical biochemistry including those in development. Flame photometry atomic absorption spectrophotometry (AAS), Flameless (Carbon rod), ion selective electrode (ISE), Fluorimetry (various forms), Spectrophotometry, visible UV NIR Chromatography, gas liquid chromatography (GLC) gas chromatography mass spectrometry (GCMS), Polarography inductively coupled plasma Spectroscopy (ICP), Mass spectrometry etc. Biotechnology methods, polymerase chain reaction (PCR). Methods in Genetic engineering (recombinant DNA technology). Cloning biomolecular tools, nucleic acid preparation and analysis. DNA preparation, Nucleic acid measurement and manipulation including purification. Southern Blotting, Receptor Gene assay, electroforetic mobility assay (EMSA) - gel shift, Gel printing, Microarray etc, gel immunosorbent assays ELISAmicroarrays. | 3     | C      |
| CPY705      | <b>MOLECULAR BIOLOGY TECHNIQUES AND APPLICATION IN HUMAN MEDICINE</b><br><br>Basic Principle and application of molecular Biology Technique molecular Biology in Pathology of diseases especially inherited disorders, Genomics and proteomics Introduction to Bioinformatic and data mining   |       |        |

|        |   |   |   |
|--------|---|---|---|
| CPY704 | <b>NUCLEAR MEDICINE</b><br><br>Basic principles and application of nuclear chemistry radioisotopes, radioimmunoassay, radiobiology, Quenching safety precaution. Licensing etc, Nuclear Medicine in diagnosis, Nuclear Medicine and Tumour Markers  | 2 | E |
| CYP721 | <b>REPRODUCTIVE ENDOCRINOLOGY</b><br><br>Mechanism of hormone action, Biosynthesis of steroid hormones, Infertility, role of hormones in infertility, diagnosis of infertility, The disorders of male gonadal function, disorders female gonadal function, influence of other endocrine organ dysfunction, sex hormone pregnancy, pregnancy associated disorders Hirsutism and Virilism, Investigation of steroid hormone disorders, Follicle dynamics impotence etc.   | 4 | E |
| CPY    | <b>NUTRITION AND METABOLISM</b><br><br>Review of intermediary metabolism, Interdependence among Macro and Micronutrients, Metabolic pathways, Carbohydrate metabolism, Digestion, absorption, assimilation, utilization of glucose glycolysis, Reactions of the glycolytic pathway, energy held and glucose oxidation peculiarities of glucose oxidation by erythrocytes, the citric acid cycle, clinical/applied aspects, Glycogenesis, glycogenolysis, inherited disorders of carbohydrate metabolism, The hexose monophosphate shunt (HMP), metabolic and clinical significance of HMP shunt, Interconversion of mono-saccharides, glucose homeostasis, diabetes and hypoglycaemia, Hormones regulation glucose homeostasis, glucose tolerance tests etc, Lipid Metabolism, Digestion, absorption and assimilation of lipids, The plasma lipids, Transportation and separation of lipids, Lipids and cardiovascular disease, Relationship of lipid to other biomarkers of cardiovascular disease, Metabolic relationship between lipid metabolism and the other major macronutrients such as carbohydrate and protein, The minerals, classification, role in metabolism, Some key minerals Na-K-Cl-Mg, Ca2+, P43 etc, Biochemical and clinical significance, The trace elements, Definition classification - essentials and non essential trace nutrients, Toxic trace metals, Metal toxicology, Mechanism of toxicity, Environmental Toxicology, Metal toxicology and public Health, Environmental Pollution etc, Antidote and metals Nutritional intervention on metal toxicity, Antioxidant trace elements, some important essential trace elements, Fe, Cu, Zn, Se, FL, Mn, Sn, Mb over dose and toxicity, Some important toxic trace elements Cd, Pb, Hg, As, Br etc, Protein and amino acid metabolism, Sources of protein digestion absorption, assimilation, utilization, transportation, Amino acid progenies, structure reactions, classification, Amino acid metabolism, important biochemical compounds from individual amino acid metabolism, neurotransmitters, hemoglobin, chorine, Beta glutathione, antioxidants etc, Interrelationship between amino acid and other Micronutrients such as vitamins etc, Some important metabolic pathways of clinical | 4 | C |

|         |   |   |   |
|---------|---|---|---|
| CPY 712 | <b>BIOSTATISTICS</b><br>Research proposal and Methodology Experimental design/experimental principles Descriptional analysis, computer application information, technology, Data management and processing Multiple comparisons, Analysis of data from investigations Various data processing packages e.g. SPSS, EPINFOR etc.  | 2 | C |
| CPY731  | <b>IMMUNOLOGY</b><br>Introduction to Immunology Ntigens (Imrnunogens) and the Immune response, fate of antigens, functions the lymphoid System Anaphylactic reactions - antibody and cell mediated Types tests for cellular Immne responses Diagnostic immunological tests Autoimmunity, immunodeficiency, states, immunoproliferative disorders, immunologic tolerance and immuno suppression, The major histocompatibility and transplantation reactions immune complex diseases. Immunity to tropical parasitic infections, viral Immunology, Immunology and protein calorie malnutrition, tumour Immunology and immuno haemology. | 3 | E |
| CPY 732 | <b>IMMUNOLOGY LABORATORY METHODS</b><br>Detection and quantification of antigen, antibody and complement double and single radial diffusion tests, capillary tube, oudin, Ouchterlony, Immuno-electrophoresis, Mancini, Complement, Immuno fluorescence assay (IFA), Enzyme-linked immuno absorbent assay,(ELISA) Protein Fractionation procedures.   | 2 | E |
| CPY741  | <b>PROJECT</b><br>A project which will test the candidate's ability to carry out independent investigation and application of knowledge to further understand of metabolic basis of disease.  | 6 | C |
| CPY706  | <b>MOLECULARBIOLOGY&amp;BIOTECHNOLOGY TECHNIQUES</b><br>Genomic, Gene purification and amplification. Polymerase, chain reaction technique Construction of genetic maps, Biotechnology recombinant DNA Hybridoma, general preparation and storage of reagents for diagnosis use. Preparation and purification of antibody and antigen for diagnostic tools  | 2 | E |

**4. M.PHIL DEGREE IN CHEMICAL PATHOLOGY**

4.1. Admission to the programme shall be open to:

- (a) Candidates who have attained a adequate mark in the M.Sc. degree programme in Chemical Pathology of the Ladoke Akintola University ofTechnology to proceed to M.Phil (50-54.9%)
- (b) Candidates who possess a Master's degree in Chemical Pathology or equivalent qualification from other Universities recognized by Senate. The mark obtained as assessed from the transcript must satisfy item (A)

**4.2 Candidates admitted to the programme shall be required to take and pass examinations in course CPY 701 and CPY 711 except those with M.Sc. Chemical Pathology from Ladoke Akintola University of Technology or from other universities: recognized by Senate. Candidates who wish to specialize in immunology are required to take and pass examinations in course.**

CPY 731, CPY 732. Likewise candidates who wish to specialize in endocrinology must pass CPY 721. The field of specialization shall be decided by candidates in consultation with the Head of Department and supervisor(s).

**4.3 Candidates admitted to the programme can specialize in one of the following areas:**

- (i) Clinical Enzymology
- (ii) Clinical Vitaminology
- (iii) General Endocrinology &Metabolic disorders
- (iv) Immunology
- (v) Lipid Metabolism
- (vi) Protein Metabolism
- (vii) Reproductive Endocrinology
- (viii) Molecular Biology and Human Genetics
- (ix) Xenobiotics and Toxicology
- (x) Clinical Nutrition, Trace elements and antioxidants.

**4.4** A candidate shall present dissertation of his/her research and be examined orally by a Board of Examiners according to the University Regulations.

**4.5 Duration of the Course:** A candidate's registration shall normally lapse if he has not fulfilled the requirement for the award of the degree after six semesters of full time or twelve semesters of part-time registration.

#### **M.Phil/Ph.D Programme in Chemical Pathology**

Admission to the programme shall be opened to:

Candidates who attain a weighted average of over 60% in the relevant examinations of the eighteen months M.Sc. course in chemical Pathology of the Ladoke Akintola University of Technology can be admitted directly for a Ph.D degree programme.

Candidates whose weighted average marks at the one year M.Sc. degree examination in Chemical Pathology is between 55.59.9% will be admitted to the M.Phil/Ph.D programme and may be converted later to a Ph.D programme after two semesters (on fulltime registration) of four semesters (on part time registration) of satisfactory performance.

(c) Candidates who have successfully complete an M.Phil degree programme in Chemical Pathology of this University or any other University recognized by the Science.

#### **5.2**

(a) The programme shall normally not involve a course work except where the Department specifically recommends that such courses be taken for remedial purposes.

(b) Candidates can be admitted on either full time or part time registration.

(c) The degree programme shall normally not be less than six semesters for full time and ten semesters for part time registration. However a period of study originally approved for the M.Phil may be accepted as satisfying a specific part of the period of Ph.D degree. In no circumstances however, may a period exceeding 12 calendar months be waived for any candidate.

(d) A candidate's registration shall normally lapse if he has not fulfilled the requirements for the award of the degree after ten semesters of full time or fourteen semesters of part time registration or an equivalent period pro rata for a combination of part time and full time registration.

#### **Area of Specialization**

Candidates in consultation with the Head of Department and Supervisor(s) may specialize in any of the following areas as stated previously.

(e) The degree of Ph.D in Chemical Pathology shall be awarded on the basis of a thesis embodying an original contribution to knowledge. A candidate shall be examined orally by a board of examiners according to the University regulations.

**(8)                  DEPARTMENT OF**  
**PHARMACOLOGY & THERAPEUTICS**

**A    MBBSS PROGRAMME:**

**INTRODUCTORY COURSES:**

Definition of Pharmacology, Routes of Drug administration  
Absorption, distribution, metabolism and excretion of Drugs,  
Reception and receptor classifications.

Therapeutics index, drug-drug interaction, Hypersensitivity and drug toxicity  
Pharmacogenetics. Factors that affect drug response.

Complex Drug action-cumulating, Tolerance, Synergism, Antagonism, Quantitative aspect of dose - Response relationship-  
Bioassays, Efficacy, Potency. Drug prescription and clinical approach to rational drug choice.

Principles of chemotherapy, resistance to chemotherapeutic agents and mechanism of actions of drugs.

Autocoids-5 Hydroxytryptamine, Renin-Angiotensin kinins. Bradykinin Kallikrin substance, Postaglandins, Leukotrienes and other Histamine receptors and antagonists

**BLOCK COURSES**

- 1      Antimicrobial Agents  
Sulphonamides, Pencillins, Streptomycin and Aminoglycosides, Cephalosporin, tetracyclines, Chloramphenicol and other broad spectrum antibiotics, Azalides, Quinolines.
- 2      Chemotherapy of Tuberculosis/Leprosy  
Antiviral drugs  
Development in Antiviral drugs  
Drug treatment of HIV / AIDS, retroviral drugs.

3      Drug treatment of Amoebiasis, trypanosomiasis, Leishmaniasis, filariasis, Antiprotozoal therapy, Antimalarial drugs.

4      Endocrine Pharmacology  
Hypoglycemic agent-Oral hypoglycemic Agents, Insulin and glucagons.  
Thyroid and antithyroid drugs.  
Estrogens and progestogens.  
Ovulatory drugs and Contraceptives agents.

Steroidal and Non-steroidal  
Anti inflammatory  
Chemotherapy of Neoplastic diseases and future strategies of cancer therapy.  
Drugs and liver

Neurotransmitters - Biosynthesis, storage, Uptake, NA, and other sympathomimetic Anines, Synthesis storage and release of ACH, Cholinergic drugs, cholinesterase Anticholinesterases, Atropine and related drugs, Ganglionic Blockers, Neurotransmitter Blockers

**BLOCK II COURSES**

Innervation and the hormones of the GIT Purgatives, Antidiarrhea and Sparmodic Drugs. Gastric acid secretions and drug used to inhibit or neutralize secretions - Antacids, H2 .receptor antagonists. Proton pump inhibitors. Treatment of H. Pylori infections. Emetics and antiemetic drugs.  
Drug treatments of inflammatory bowel diseases. Drugs affecting the billiary system.

Cardio-vascular pharmacology. The renin-angiotensin system, Drug treatment of hypertension; Cardiac glycosides, Antidysarrhythmic drugs, antianginal drugs and vasodilators. Drug treatments of heart failure, Vasoconstrictor drugs. Drug treatments of shock and hypertension. Ophthalmic pharmacology - Mydriatics and cycloplegics, Drug treatment of glaucoma and ocular congestion.

Drug and the kidneys. Diuretics. Urinary antiseptics. Drugs which alter excretion of organic molecules, Psychosocial pharmacology - Drug abuse and other related Psychosocial problems. Drugs that act on the respiratory system, antiasthmatic drugs, cough suppressants and expectorants. . Dermatological preparations - Emollients and antiseptics.

CNS Pharmacology - Anti-psychotic drugs, anticonvulsants, Parkinson and Anti Parkinson Drugs; CNS stimulants and auto depressant drugs, Movement disorders and drug treatment. Immunomodulator - Immune boosters and gene therapy. Anticogulants / Hematinics / Fibrinolytic agents

## **B      NURSING PROGRAMME:                 PHA 300**

### **1ST SEMESTER**

#### **(A) INTRODUCTION TO PHARMACOLOGY**

Drugs names and sources

Pharmacokinetics

Pharmacodynamics

Routes of drugs administration

Drugs - drugs, drug-food interactions

Drugs -reception interaction

#### **(B) AUTONOMIC PHARMACOLOGY**

Autonomic Cholinergies

Autonomic Adrenergic system

Narcotic and non-narcotic drugs

Narcotic - Morphine derivatives

Non-narcotic,-steroidal and non-steroidal anti-inflammatory drugs

Drugs addiction and management of drugs dependence

#### **(C) CNS PHARMOCOLOGY**

- Sedative - hypnotic drugs
- Stimulant drugs
- Antipsychotic drugs
- Axiolytic drugs
- Antidepressant
- Antiepileptics
- Drugs treatment of Parkinson
- Local and general anaesthetic drugs

#### **(D) DRUGS USED IN GIT DISORDERS**

- Anti-ulcer
- Anti-diarrhea Laxatives/cathartic Chemotherapy
- Basic principle of chemotherapy and resistance to chemotherapeutics agents.

### **2<sup>nd</sup> SEMESTER PHA 303**

#### **Chemotherapy**

Chemotherapy of mycobacteria diseases, antiviral drugs, antifungal drugs, antiCrilematic drugs.

Drugs used in the treatment of amoebiasis, trypanosomiasis, Leischmaniasis and other Antiprotozoa, Antiseptic and Disinfectants

#### **(B) Drugs used for Respiratory Disorders**

Anstiasthmatic drugs, Nasal Decongestant, Expectorants, Antitusives  
Heavy metals and Antagonists, Anoretics, vitamins

#### **(C) Cancer Chemotherapy Antiallergic and tonmimosives.**

Hypolipidemic drugs Cardiovascular drugs

Cardiotonics, antihypertensive, antidyrrhythmic drugs,  
Antiangular drugs,

#### **(D) Endocrine Drugs**

Thyroids, antithyroids, drugs used for disorders of the adrenal cortex, drugs for disorders of pancreas, Antidiabetic. Drugs acting on the female reproductive system, drugs acting on the male reproductive system.

**HARMATTAN SEMESTER PHA 302**

- (A) Introduction to Pharmacology, Routes of drug Administration  
Drug Names and sources, Pharmacokinetics and Pharmacodynamics Drug-drug interaction, Drug-Receptor Interaction, drugs anxiolytics
- (B) Autonomic Pharmacology  
The cholinergic and adrenergic systems, Anti depressants and anti parkinsons drugs. Local and general anaesthetic agents.
- (C) Narcotic and Non-narcotic drugs  
Drugs Addiction and Management of drug dependence. Sedative and Hypnotics, CNS stimulants.
- (D) Drugs that acts on GIT  
anti-ulcer drugs, antidiarrhea, antiemetics.  
Laxatives and cathartics.  
Basic principle of Chemotherapy.  
Chemotherapy and Resistance to Chemotherapeutic Agents.

**C****BMLS PROGRAMME  
PHM 302 PHARMACOLOGY I**

- Bioassays,. Routes of administration. Pharmacokinetics, Absorption of drugs in man. Excretion. Biotransformation and Elimination. Pharmacology terms, Scope of pharmacology. Origin/sources and nature of drugs including Structure-activity relation. Mode of action of drugs. Compliance, individual variations, presence of other drugs and Genetic effects  
Tolerance and anaphylaxis, effect of diseases, Receptor and receptor isolation. Types of drug action

**POSTGRADUATE [MASTER'S (MSc) AND DOCTORAL (PhD)] DEGREE PROGRAMMES BY INSTRUCTION/COURSE-WORK AND RESEARCH IN THE DEPT OF PHARMACOLOGY AND THERAPEUTICS****A. GENERAL RULES****GR1 Application to Study:**

- (a) Applications to study for Master's (MSc) and Doctoral (PhD) degrees by instruction/course-work and research in the Department of Pharmacology and Therapeutics, Faculty of Basic Medical Sciences, College of Health Sciences, Ladoke Akintola University (LAUTECH), Nigeria, must be made on prescribed LAUTECH forms (available in the Registrar's Office), accompanied by relevant documentation, and lodged in the Faculty Office of the Faculty of Basic Medical Sciences, College of Health Sciences;
- (b) An applicant who has studied at any other university (besides LAUTECH) in or outside Nigeria must, in addition, present his/her academic record and a certificate of good conduct from his or her former institution.

**GR2 Selection requirements:**

- (a) All candidates seeking admission into the MSc or PhD degree programme by instruction or research in the Department of Pharmacology and Therapeutics are required to produce satisfactory evidence of their academic competence to work for the qualification sought to the Senate of LAUTECH. The Senate may decline to admit as a candidate for the qualification sought, any person/s whose previous academic attainments are, in its opinion, not sufficiently high to warrant such admission;

- (B) An applicant who has graduated from another recognised University in or outside Nigeria, or who has, in any other manner attained a level of academic competence which, in the opinion of the Senate, is adequate for the purpose of postgraduate studies by instruction or research in Pharmacology and Therapeutics, may be admitted as a student into the MSc or PhD degree programme by instruction or research in the Department of Pharmacology and Therapeutics.

**GR3 Concurrent registration:**

Except by special permission of the Senate:

- (a) no student shall be registered for more than one postgraduate degree qualification at a time; nor
- (b) shall any student, while registered at any other university, be registered concurrently at LAUTECH for MSc or PhD in Pharmacology and Therapeutics.

**GR4 Registration:**

- (a) In order to pursue their postgraduate studies in any semester, all students are required to complete the University's relevant registration procedure;
- (b) The Council, on the recommendation of the Senate, may impose conditions for the registration of any student;
- (c) On application to the Faculty Office, and with the approval of the Senate, a student's registration may be suspended for a specified period of time. Such student will remain subject to the rules of the University, and may return to register before or at the expiry date of his/her suspension. The period during which his/her registration is suspended shall not be included in any calculation towards the minimum and maximum periods prescribed for the postgraduate degree qualification.

**Gr5 Ancillary, pre-requisite and co-requisite requirements:**

- (a) The Department, Faculty and/or College may prescribe ancillary modules in any curriculum;
- (b) The Department, Faculty and/or College may specify the attainment of a minimum mark in an ancillary, pre-requisite or co-requisite course or module, or any other requirement before registration for a proposed postgraduate programme is permitted;
- (c) Registration for a post-graduate programme will be conditional on meeting all pre- and co-requisites requirements for the particular postgraduate degree programme.

**GR6 Programme registration and alteration:**

No student shall be registered for any postgraduate degree programme/curriculum unless his or her programme has been approved by the Senate of LAUTECH. An approved programme may be modified only with the consent of the Senate.

**GR7 Period of attendance:**

Every student for a postgraduate degree programme in the Department of Pharmacology and Therapeutics shall meet the relevant admission, attendance and performance requirements for the programme as prescribed by the Faculty of Basic Medical Sciences, College of Health Sciences, and approved by the University Senate.

**GR8 Academic exclusion:**

- (a) The Council may, with the approval of the Senate, refuse readmission to a student who fails to satisfy the minimum academic requirements for readmission;
- (b) Students excluded or refused re-registration may not be readmitted to the postgraduate programme in the Department of Pharmacology and Therapeutics until they are able to demonstrate that they have achieved a level of

academic competence satisfactory to the Department, Faculty, College and the Senate.

**GR9 Ethics:**

All academic activities, research in particular, shall comply with the relevant University policies on bioethics and related requirements as determined by the Senate and Council of LAUTECH.

**GR10 Payment of fees:**

- (a) Except by special permission of the University Senate and Council:
  - (i) an applicant for a postgraduate degree programme in the Department of Pharmacology and Therapeutics shall not be registered until all relevant prescribed fees have been paid;
  - (ii) a student shall not be entitled to admission to an examination, nor to receipt of examination results, until all relevant prescribed fees have been paid.
- (c) A student shall not be entitled to conferment or award of a postgraduate degree in the Department of Pharmacology and Therapeutics until all monies due to the University have been paid.

**RULES FOR MASTERS (MSc/MPhil) DEGREE BY RESEARCH IN THE DEPT OF PHARMACOLOGY AND THERAPEUTICS**

**Note:**

The following rules are additional to the preceding General Rules:

**GR1GR10** above, and shall be applicable to all candidates for Master's (MSc/MPhil) degree by instruction or research in the Department of Pharmacology and Therapeutics, Faculty of Basic Medical Sciences, College of Health Sciences, Ladoke Akintola University of Technology, Ogbomoso, Nigeria.

**MR1 Admission Eligibility:**

To qualify for admission into the Master's (MSc) degree programme by instruction or research in the Department of Pharmacology and Therapeutics of Ladoke Akintola University of Technology, an applicant must have an acceptable (minimum of Second Class Lower Division or its equivalent professional qualification) first degree in either Medicine, Veterinary Medicine, Pharmacy, Pharmacology, or any other health-related discipline of LAUTECH or any other recognised University in or outside Nigeria.

**MR2 Admission criteria:**

An applicant shall not be registered for the Masters (MSc) degree programme by research in the Department of Pharmacology and Therapeutics unless he or she has:

- (i) satisfied the admission and other requirements for the prescribed pre-requisite degree;
- (ii) attained a satisfactory level of academic competence as judged by the University Senate on the advice of the Department of Pharmacology and Therapeutics, Faculty of Basic Medical Sciences, and College of Health Sciences.

**MR3 Registration period:**

A student for the of Master's (MSc) degree programme by instruction or research in the Department of Pharmacology and Therapeutics shall be registered for a minimum period of two (for MSc) or three (for MPhil) semesters for full-time students, or for a minimum of four (for MSc) or six (for MPhil) semesters for part-time students, before the degree may be conferred.

**MR4 Programme/Curriculum:**

- (a) A student for the of Master's (MSc) degree programme by instruction or research in the Department of Pharmacology and Therapeutics shall be required to pursue an approved programme of research on some prescribed pharmacological and therapeutics subjects falling within the scope of the studies in the University;
- (b) A student for the of Master's (MSc) degree programme by instruction or research in the Department of Pharmacology and Therapeutics shall also be required to comply with such other regulations and conditions of the of the Faculty and College as may be prescribed by the University Senate before the degree is conferred.

**MR5 Proposed study plan:**

- (a) Before registration, an applicant for the Master's (MSc) degree programme by instruction or research in the Department of Pharmacology and Therapeutics shall submit, for the approval of the University Senate through the Department, Faculty and College, a study plan of the proposed subject of study;
- (b) The Senate may, at its discretion, decline to approve a study plan if, in its opinion:
  - (i) it is unsuitable, or
  - (ii) it cannot be profitably studied or pursued under the supervision of a University staff, or

(iii) the conditions under which the applicant proposes to work are unsatisfactory.

- (c) Ethical approval is required for all studies involving the use of animals and human subjects.

**MR6 Supervision:**

The University Senate shall, on the recommendation of the Faculty/College Board of Study, appoint one or more appropriately-qualified supervisor/s, at least one of whom shall be a staff of the University, to guide, advise and supervise a Master's (MSc) student whose study plan and research topic has been approved.

**MR7 Progression:**

A student who, after six (for MSc) or eight (for MPhil) semesters of full-time study, or ten (for MSc) or twelve (for MPhil) semesters of study as a part-time student, has not completed the requirements for the award of a Master's degree, shall be required to apply for re-registration, which will only be permitted by University Senate on receipt of a satisfactory motivation by the supervisor/s through the Faculty/College Board of Study.

**MR8 Submission of Master's dissertation/thesis:**

- (a) At the end of his or her study, every student for the of Master's (MSc or MPhil) degree by instruction or research in the Department of Pharmacology and Therapeutics shall submit a dissertation (for MSc) or a thesis (for MPhil) embodying the results/findings of his/her research work;
- (b) At least three months before a dissertation or thesis is to be submitted for examination, a Master's student shall give notice, in writing, of his/her intention to submit such a dissertation or thesis and the title thereof, to the Dean of the Faculty. However, in the event of a student failing to submit the dissertation or thesis for examination within six

months thereafter, the notice will automatically lapse, and a further notice of intention to submit his/her dissertation or thesis shall be required.

**MR9 Format for Master's dissertation or thesis:**

- (b) Every Master's dissertation or thesis submitted for examination shall include a declaration stating that it has not been previously submitted for a degree in LAUTECH or any other University, and that it is the student's own original work;
- (c) Every Master's dissertation or thesis submitted shall be in such a format as prescribed by the University Senate and the rules of the Faculty/College, provided that each Master's dissertation or thesis shall include an 'abstract' (in English) not exceeding 350 words;
- (d) A Master's dissertation or thesis may include one or more original research papers, with the student as the prime author, published or in press, in peer-reviewed, scientific journals approved by the Faculty/College Board of Study.

**MR10 Examination:**

- (a) On the advice of the Faculty/College Board of Study, the University Senate shall appoint for each dissertation, two examiners, at least one of whom shall be external to the University who shall serve as 'external examiner' and will be responsible for external examination of the dissertation (for MSc) or thesis (for MPhil);
- (b) A student's supervisor or co-supervisor will not be eligible for appointment as an examiner for the student's dissertation or thesis;
- (c) The Senate, at its discretion, may require a student to defend his or her dissertation or thesis.

**Mr11 Award of Master's degree with distinction:**

On the recommendation of the examiners, and in accordance with the relevant rules of the Faculty and College, a Master's (MSc or MPhil) degree in the Department of Pharmacology and Therapeutics may be awarded with 'distinction'.

**MR12 Conversion of Master's degree registration to Doctoral degree registration;**

In exceptional cases and based on excellent academic performance, the University Senate, on the recommendation of the Faculty/College Board of Study, may convert a Master's (MSc or MPhil) student's registration to a Doctoral degree registration after four semesters of outstanding academic/research performance by the Master's student. Such a student will, however, be required to continue his/her study as a doctoral student for a minimum of another two semesters before the doctoral degree can be conferred.

**MR13 Re-examination of dissertation/thesis:**

- (a) A failed Master's (MSc or MPhil) dissertation or thesis may not be re-examined;
- (b) On the advice of the Faculty/College Board of Study, the University Senate may invite a student to re-submit a Master's (MSc or MPhil) dissertation or thesis in a revised or extended form.

## **C.**

### **RULES FOR DOCTORAL (PhD) DEGREE BY RESEARCH IN THE DEPT OF PHARMACOLOGY & THERAPEUTICS**

#### **Note:**

The following rules are additional to the preceding General Rules

**GR1GR10**, and shall be applicable to all candidates for the degree of Doctor of Philosophy by research in the Department of Pharmacology and Therapeutics, Faculty of Basic Medical Sciences, College of Health Sciences, Ladoke Akintola University of Technology, Nigeria.

#### **DR1 Admission Eligibility:**

To qualify for admission into the doctoral (PhD) degree programme by research in the Department of Pharmacology and Therapeutics of Ladoke Akintola University of Technology, an applicant must have an acceptable Masters (MSc or MPhil) degree or any other Senate-approved academic qualification in either Medicine, Veterinary Medicine, Pharmacy, Pharmacology, or any other health-related discipline of LAUTECH, or any other recognised University in or outside Nigeria.

#### **DR2 Admission criteria:**

An applicant shall not be registered for the degree of Doctor of Philosophy (PhD) programme by research in the Department of Pharmacology and Therapeutics unless he or she has:

- (i) satisfied the admission and other requirements for relevant prescribed pre-requisite degree as specified by the Faculty of Basic Medical Sciences and/or College of Health Sciences;
- (ii) attained a satisfactory level of academic competence as judged by the University Senate on the advice of the Department of Pharmacology and Therapeutics, Faculty of Basic Medical Sciences, and College of Health Sciences.

#### **DR3 Registration period:**

A student for the degree of Doctor of Philosophy by research in the Department of Pharmacology and Therapeutics shall be registered for a minimum period of four semesters for full-time students, or for a minimum of eight semesters for part-time students, before the degree may be conferred.

#### **DR4 Programme/Curriculum:**

- (a) A student for the degree of Doctor of Philosophy (PhD) by research in the Department of Pharmacology and Therapeutics shall be required to pursue an approved programme of research on some prescribed pharmacological and therapeutics subjects falling within the scope of the studies in the University;
- (b) Such a programme must make a distinct contribution to existing knowledge in the field, and/or understanding of the subject, and afford evidence of originality shown by the discovery of new facts;
- (c) A student for the degree of Doctor of Philosophy (PhD) by research in the Department of Pharmacology and Therapeutics shall also be required to comply with such other regulations and conditions of the Faculty and College as may be prescribed by the University Senate before the degree is conferred.

#### **DR5 Proposed study plan:**

- (a) Before registration, an applicant for the degree of Doctor of Philosophy (PhD) by research in the Department of Pharmacology and Therapeutics shall submit, for the approval of the University Senate through the Department, Faculty and College, a study plan of the proposed subject of study;
- (b) The Senate may, at its discretion, decline to approve a study plan if, in its opinion:
  - (I) it is unsuitable, or

- (ii) it cannot be profitably studied or pursued under the supervision of a University staff, or
  - (iii) the conditions under which the applicant proposes to work are unsatisfactory.
- (c) Ethical approval is required for all studies involving the use of animals and human subjects.

**DR6 Supervision:**

The University Senate shall, on the recommendation of the Faculty/College Board of Study, appoint one or more appropriately-qualified supervisor/s, at least one of whom shall be a staff of the University, to guide, advise and supervise a doctoral student whose study plan and research topic has been approved.

**DR7 Progression:**

A student who, after eight semesters of full-time study, or twelve semesters of study as a part-time student, has not completed the requirements for the award of his/her doctoral degree, shall be required to apply for re-registration, which will only be permitted by University Senate on receipt of a satisfactory motivation by the supervisor/s through the Faculty/College Board of Study.

**DR8 Submission of Doctoral Thesis:**

- (a) At the end of his or her study, every student for the of degree of Doctor of Philosophy (PhD) by research in the Department of Pharmacology and Therapeutics shall be required to submit a thesis embodying the results/findings of his/her research work;
- (b) At least three months before the thesis is to be submitted for examination, the student shall give notice, in writing, of his/her intention to submit such a thesis and the title thereof, to the Dean of the Faculty. However, in the event of a student failing to submit the thesis for examination within six months thereafter, the notice will lapse automatically, and a further notice of intention to submit the thesis shall be required.

**DR9 Format of doctoral thesis:**

- (a) Every doctoral thesis submitted for examination shall include a declaration stating that it has not been previously submitted for a degree in LAUTECH or any other University, and that it is the student's own original work;
- (b) Every doctoral thesis submitted shall be in such a format as prescribed by the University Senate and the rules of the Faculty/College, provided that each thesis shall include an 'abstract' (in English) not exceeding 500 words;
- (c) A doctoral thesis may include one or more original research papers, with the student as the prime author, published or in press, in peer-reviewed, scientific journals approved by the Faculty/College Board of Study.

**DR10 Examination:**

- (a) The University Senate shall, on the advice of the Faculty/College Board of Study, appoint for each doctoral thesis, three examiners, at least two of whom shall be external to the University who shall serve as 'external examiners' and will be responsible for external examination of the thesis;
- (b) Except with the permission of the Senate, at least one of the external examiners for a doctoral thesis shall be based outside Nigeria;
- (c) A student's supervisor or co-supervisor will not be eligible for appointment as an examiner for the student's thesis;

**DR11 Defence of doctoral thesis:**

The University Senate, at its discretion, may require a student to defend his or her doctoral thesis.

**DR12 Re-examination of doctoral thesis:**

- (c) A failed doctoral thesis may not be re-examined;
- (d) On the advice of the Faculty/College Board of Study, the University Senate may invite a student to re-submit a doctoral thesis in a revised or extended form.

## **COURSE CONTENTS:**

### **MASTER'S (MSc) DEGREE PROGRAMME BY INSTRUCTION/COURSE-WORK IN PHARMACOLOGY**

**COURSE CODE:PHM 70104 Units**

#### **Introductory Pharmacology, Toxicology and Therapeutics**

##### **Aim:**

To provide learners with an understanding of the basic concepts, terminologies and definitions used in pharmacology, toxicology and therapeutics, with special reference to pharmacodynamics and pharmacokinetics.

##### **Content:**

**Pharmacodynamics:** Drug receptors and receptor theories; agonists and antagonists; types of antagonisms; neurotransmitters and modulators; toxicology; therapeutic index; central and peripheral nervous systems; sympathetic and parasympathetic nervous systems; adrenergic and cholinergic receptors; adrenergic, cholinergic and ganglion stimulants and depressants.

**Pharmacokinetics:** Routes of drug administration; drug liberation, absorption, distribution, metabolism and elimination. Volume of distribution, bioavailability, half-life ( $t_{1/2}$ ), steady-state, and other pharmacokinetic parameters.

##### **Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

## **COURSE CODE: PHM 702 04 Units**

#### **Autonomic, Autocoid and Neuropharmacology**

##### **Aim:**

To provide learners with an advanced knowledge of the pharmacological principles of Autonomic and Central Nervous Systems; mechanisms and sequential effects of centrally-acting drugs; rationale for the management of CNS disorders; and to provide learners with an understanding of the pharmacology of drugs affecting inflammation and mediators of inflammation.

##### **Content:**

Autocoid pharmacology with special reference to histamine, serotonin (5-HT), prostaglandins, leukotrienes, thromboxanes, kinins, vasoactive peptides, etc. Treatment of pain, gout and other inflammatory conditions, with specific reference to non-steroidal anti-inflammatory drugs (NSAIDs), opioids, alcohols, general and local anaesthetics. Immunopharmacology. CNS disorders, with special reference to depression, epilepsy, maniac, Parkinson's disease, migraine, headache, etc, and their pharmacotherapy.

##### **Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE: PHM 703 06Units**

**Therapeutic Drug Monitoring, Toxicology and Pharmacotherapy of Infectious Diseases**

**Aim:**

To equip learners with an advanced knowledge of the pharmacokinetics of various drug classes, thus enabling them to easily interpret drug-blood levels required for the implementation of drug dosage regimen adjustments; to enable them understand and address toxic chemicals and basic drug overdosage scenarios; and to provide them with an understanding of the basic principles and mechanisms by which anti-infective (anti-parasitic) drugs act in the treatment of infectious, parasitic diseases.

**Content:**

Therapeutic drug Monitoring (TDM) of the major classes of drugs; toxicology of air pollutants, xenobiotics and heavy metals (lead, arsenic, mercury, etc); Clinical chemistry and liver function tests. Pharmacology of antimicrobial agents, with specific reference to antibacterial, antifungal, antiviral, antiprotozoal and antelmintic drugs. Antineoplastic drugs Principles of cancer chemotherapy, cancer cell cycle kinetics, anti-metabolites, alkylating agents, antibiotics, microtubule inhibitors, steroid hormone antagonists, monoclonal antibodies.

**Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE: PHM 70404 Units**

**Management/Treatment of Some Autonomic and Hormonal Disorders I**

**Aim:**

To provide learners with therapeutic and clinical pharmacological concepts used in the prevention, diagnosis, management and/or treatment of some common diseases.

**Content:**

Management and/or treatment of the following pathologic disorders:

**GIT** Peptic ulcer disease; gastro-oesophageal reflux disease (GORD), inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), diarrhoea, constipation, hepato-biliary diseases, nausea and vomiting.

**Respiratory System** Bronchial asthma, chronic obstructive pulmonary disease (COPD) and other respiratory disorders, including cough, pneumonia, congestion and rhinitis.

**Endocrine System** Hormones of the pituitary and thyroid glands (growth hormone, gonadotropins, anti-diuretic hormone, hypo- and hyper-thyroidism, osteoporosis, glucocorticoids and mineralocorticoids, contraception and contraceptives, erectile dysfunction and its management, menopausal syndrome and hormone replacement therapy).

**Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE:** PHM 705

**04 Units**

**Management/Treatment of Some Autonomic and Hormonal Disorders II**

**Aim:**

To provide learners with therapeutic and clinical pharmacological concepts used in the prevention, diagnosis, management and/or treatment of some common diseases.

**Content:**

Management and/or treatment of the following pathologic disorders:

**Cardiovascular System** Blood disorders (thrombosis, haemophilia and anaemia); Vitamins and vitamin supplements; Renin-Angiotensin-Aldosterone System; Hypertension and its therapeutic modalities (non-drug and drug approaches); Myocardial Infarction (MI); Angina pectoris; cardiac arrhythmias; diuretics; congestive heart failure (CHF).

**Hormonal/Metabolic** Diabetes mellitus, insulin and regulation of blood glucose concentrations, insulin resistance, obesity and hyperlipidaemia.

**Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE:** PHM 70604 Units

**Investigative Techniques in Pharmacology and Therapeutics**

**Aim:**

To equip learners with an advanced understanding of research techniques, protocols and processes in pharmacology and therapeutics.

**Content:**

Research techniques and protocols in pharmacology; ethical issues; writing a research proposal; types of research methods and designs; qualitative and quantitative research techniques; sampling, validity and reliability in research; analytical techniques and biostatistics. Investigative techniques used in pharmacogenomics, radiopharmaceuticals, nutraceuticals and ethnopharmacology.

**Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminar (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE:** PHM 707

**04 Units**

**Biostatistics** (To be taken with other postgraduate students in the College of Health Sciences):

**Aim:**

To equip learners with advanced knowledge and understanding of research techniques, protocols and processes to evaluate evidence, arguments and assumptions, and to reach sound conclusions and judgements in pharmacology and therapeutics.

Uses of statistics; data collection, organization and analysis; concept of 'Probability' distribution; estimation techniques and hypothesis testing; Student t-test; Chi-square test; analysis of variance (ANOVA); regression analysis; univariate and bivariate analysis, etc; analyses and discussion of results.

**Assessment:**

**Formative** 30% of the average of 2 tests + 1 term paper or seminars (constituting 30% of the final mark);

**Summative** 1x3-hour theory paper (constituting 70% of the final mark).

**COURSE CODE: PHM 708**

**07 Units**

**Research Project**

**Aim:**

To provide learners with advanced knowledge and skills relevant to conducting Master's and Doctoral degrees' research; and to encourage focused independent research among learners.

**Content:**

Literature review; critical analysis of scientific literature; research problem identification; writing a research proposal; sampling, validity and reliability in research; bioethics and ethical considerations; analyses and discussion of results.

**Assessment:**

Individual's contribution, effort and participation in the research project will be judged by a team of internal and external examiners as 100%.

All the eight courses are compulsory, and learners must satisfy the examiners in all the courses.

**(9) DEPARTMENT OF HAEMATOLOGY & BLOOD TRANSFUSION**

**SIMPLE BASIC TESTS AND KEY DIAGNOSTIC TEST (PRACTICAL)**

(A) Performance of simple interpretation of anomalies.

- 1 Packed cell volume (PCV) - Normal values in male and female in interpretation of anomalies.
- 2 Reading and interpretation of Erythrocyte Sedimentation Rate (ESR) -

**WINTROBE MACRO METHOD FOR**

- 1 Interpretation of Haemoglobin electrophoresis (**Hb Phenotype**)
- 2 Measurement of Haemoglobin
- 3 Normal values of Red cell indices and interpretation of anomalies.
- 4 Determination of Mean Corpuscular volume (MCV)
- 5 Determination of Mean Corpuscular Haemoglobin (MCH)
- 6 Determination of Mean Corpuscular Haemoglobin Concentration (MCHC)
- 7 Normal values of white cell count (total and differential) and platelet count
- 8 Identification of haemoglobin variants (Electrophoresis) Hb Sc, Hb, Ss, Hb Cc, Hb Ac.
- 9 Sodium Metabisulfite reduction test sickling
- 10 Manual blood counts e.g. total white blood cell count (WBC), platelet count.
- 11 Serology / immunohaematology
  - antigen - antibody reaction
  - Combs antibodies and application of direct Combs test
  - application of indirect Combs test
  - ABO blood groups and grouping methods. (Including Rhesus)
  - cross-matching
  - preparation of some blood products e.g platelet concentrate, fresh frozen plasma (FFP), platelet rich plasma (PRP), Cryoprecipitate and Leucocyte poor blood

12. Preparation and examination of blood films Leishman's stain for this blood film identification of blood cells, normal Erythrocytes Leucocytes and platelets.

Identification of abnormal red blood cells:-

Sickle cells, target cells, nucleated red blood cells, hypochromatic cells.

Polychromatic cells, spherocytes toxic granulation, left and right shift and Vaculations.

Identification of the Leukaemias acute lymphoblastic Leukaemias (ALL) Acute Myeloid Leukaemia (AML), Chronic Myeloid Leukaemia (CML), Chronic Lymphocytic Leukaemia (CLL)

**(A) THEORY (COURSE CONTENTS)**

**(B) INTRODUCTORY LECTURES**

- 1 Development, Morphology and function of red blood cells
- 2 Development, Morphology and function of white blood cells.
- 3 Development, morphology and function of platelets.
- 4 Reference values in Haematology  
Normal values of routine test carried out in the Laboratory
- 5 Collection and preservation of specimens for various test.  
e. g PCV EDTA bottle.  
Test for haemostasis - Sodium chloride bottle e.t.c

**(C) INTERMEDIATE (COURSE CONTENTS)**

- Definition and classification of anemia's
- Anaemia of chronic disease (ACD)
- Structure, function and control of synthesis of normal haemoglobins.
- Haemoglobinopathies
- Sickle cell disease
- Thalassaemia
- Genetic counseling and antenatal diagnosis of haemoglobinopathies
- Intra corporcular and Extracorpicular defects of haemolytic anaemia.
- First Incourse Assessment

**(D) SENIOR COURSE (I)**

- Haematological manifestation of I disease
- Aplastic Anaemias
- Acute Leukaemias
- Chronic Leukaemias

**(E) SENIOR COURSE (II)**

- Hodgkins Lymphoma
- Non-Hodgkins lymphoma including Burkitt's lymphoma
- Multiple myeloma and other paraproteinaemias
- 2<sup>nd</sup> Incourse Assessment

**(F) SENIOR COURSE (III)**

- Myeloproliferative disorders (ii)
- Hypersplenism
- Tropical splenomegaly syndrome
- Normal Haemostasis
- Investigation of bleeding disorders
- Vascular and platelet disorders
- Inherited Coagulation disorders
- Acquired Coagulation disorders
- Thrombosis-Aetiology, clinical features and investigations.
- Blood Group, Red cell antigens and antibodies
- Indications and complication of blood transfusion
- Rhesus incompatibility
- Haemolytic disease of the new born
- Third Course Assessment.

## **REGULATIONS FOR MBBS PROGRAMMES & EXAMINATIONS**

### **A. REGULATIONS FOR THE PRE-MEDICAL YEAR:**

1. Instruction in the pre-medical year shall be by courses quantified into credits, to be taken in the Faculty of Pure and Applied Sciences.
2. Student shall take courses as prescribed by the Faculty/College In Physics, Mathematics, Chemistry Biology and General Studies.
3. Statement of examination result shall be issued to students as appropriate at the end of the academic session.
  - (i) All medical student from 100-level to 200 level must have no outstanding course
  - (ii) A student who fails to satisfy (i) above shall be required to withdraw from the M.B.B.S programme.
4. Inter and Intra University Transfer: This will not ordinarily be entertained by the College. However, the College has the right for discretionary transfer and factors to be considered will include:
  - (i) 'O' Level Credits in Physics, Chemistry, Biology Mathematics and English Language.
  - (ii) Having offered and passed requisite U.M.E. Subjects for entry into Medical Schools.
  - (iii) For LAUTECH students, candidates must have no course outstanding at 100 level
  - (iv) Candidates from other Universities should normally have taken and passed relevant courses for the Medical Schools of their Universities and have no course outstanding.
  - (v) Cumulative grade point average (CGPA) must not be less than 4.0 on the scale of 5.0
  - (vi) For inter-university transfer, candidates who have met the above criteria should be limited in number to less than 3% of the admission quota.
  - (vii) Candidates who have been asked to withdraw from Medical Schools of other Universities shall not be admitted.
  - (viii) Transfer candidates shall have to satisfy the Screening Panel of the College of Health Sciences.

### **B. REGULATIONS FOR THE PRE-CLINICAL PROGRAMME**

1. During this period, the subjects learnt shall be Anatomy, Biochemistry and Physiology. In addition, an integrated programme by Community Health Sciences (C.H.S.) shall be taught. Progressive assessment shall be made on all the subjects taught. Promotion to the Clinical Programme shall be based on performance in:
  - (i) Progressive Cumulative Assessment (CA)
  - (ii) The formal Professional Examination in the three (3) core subject namely Anatomy, Physiology and Biochemistry.
  - (iii) A student shall be deemed qualified to sit for examinations in the College after having had a minimum of 75% attendance in class.
  - (iv) A student shall have at least 45% in the C.A. to qualify to sit for examinations.
2. Progressive Cumulative Assessment and the professional examination will earn 30% and 70% of the total marks, respectively
3. Relevant Progressive Assessment for the first professional (Part I) examination will include:  
The first Professional Examination (Part I) shall normally be held at the end of 3<sup>rd</sup> semester after entry into the pre-clinical programme and shall be moderated by External Examiners. The three components of the examination are Anatomy, Biochemistry and Physiology.
4. In order to proceed to the Clinical Programme, a candidate must have passed Anatomy, physiology and Biochemistry with a grade not less than 50% in each subject (progressive assessment and examination marks taken together).
  - a. A candidate who fails two or three subjects shall repeat a year, and shall retake all the three subjects at the end of that year.

- b. A candidate who fails one(1) subject shall resit the subject failed within a period of three months. In the interim such candidate may join the clinical classes. Such candidate must however withdraw from clinical classes if he or she fails to pass the resit examination..
- c. After repeating year 3, a candidate who fails 2 or more subjects shall be required to withdraw from the programme.
- d. (i) After repeating year 3 a candidate who fails not more than one subject may be considered by the College/Faculty Academic Board for recommendation to the Senate for resit of the subject failed.
- (ii) A candidate who fails the resit subject, shall be required to withdraw from the programme.

### C. REGULATIONS FOR THE CLINICAL PROGRAMME

1. These years constitute the Clinical years. Student's performance during the three years shall be assessed by means of progressive assessment and final examination each carrying 30% and 70% of the total marks respectively.
2. Progressive assessment shall be based on periodic evaluation and end of posting examination by the clinical supervisors.
3. Out of the 30% allotted to Progressive Assessment (P.A) (5%, shall be for attendance, 25% shall be for test)
4. To qualify to sit for any of these clinical examinations, candidates must satisfy the following conditions:
  - (a) 75% attendance (clinics, ward round and other department and extra-departmental activities)
  - (b) A qualifying score of 45% in (3) above (i.e) Progressive Assessment is required in each of the disciplines before the final examinations can be taken. But the average pass mark of the final examination shall be 50%.

### D. EXAMINATIONS IN THE CLINICAL YEARS:

1. Part II M.B.B.S. Examination: This shall normally be held 12 months after the start of the clinical posting. The subjects to be examined shall be:
  - (a) Pathology (Morbid Anatomy, Medical Microbiology and Parasitology, Haematology, Chemical Pathology and Immunology).
  - (b) Pharmacology and Therapeutics.
2. Part III M.B.B.S. Examination: This shall be held 27 to 28 months after the start of clinical postings. The subjects to be examined shall be:
  - (a) Paediatrics and Child Health
  - (b) Obstetrics and Gynaecology
3. Part IV M.B.B.S. Examination: This shall be held 6 months after the Part III Examinations. The subjects to be examined shall be
  - (i) Medicine (including Behavioral Sciences)
  - (ii) Surgery (including Anaesthesia, Radiology, Otorhinolaryngology and Ophthalmology).
  - (iii) Community Medicine.
4. The final examinations in the clinical phase shall test both theoretical knowledge and practical skills. No student shall be considered to have *passed a clinical subject unless he/she obtains 50% in the clinical part of the examinations*.
5. External Examiners shall be required to take part in the conduct of all the final examinations.

### E. RESIT OF CLINICAL EXAMINATION

#### Part II M.B.B.S.:

- (i) A candidate who fails one or both subjects shall be required to resit the failed subject(s) three months later.
- (ii) A candidate who passes the resit examination will proceed with the normal class.
- (iii) After repeating the class twice: any subsequent attempt shall be with the Senate approval on the recommendation of the College Academic Board. However, no candidate shall spend more than 3 years in the Part II M.B.B.S course.
- (iv) A candidate who fails any of the resit examination shall drop to the next lower class, undergo all postings and sit for the net University scheduled examination.

**Part III M.B.B.S.:**

- (i) A candidate who fails in one or both subjects shall be required to resit that subject 3 months later. Candidates who pass the resit examination will proceed with the normal class.
- (ii) A candidate who fails the resit examinations shall drop to the next lower class, undergo appropriate clinical postings and sit for the next University scheduled examination. Any subsequent attempt shall be with the permission of the Senate on the recommendation of the College Academic Board. Furthermore, no candidate shall proceed to the Part IV Examination without passing the part III Examination.

**Part IV M.B.B.S.:**

- (i) A candidate who fails any or all the 3 subjects shall be required to resit the subject(s) 3 months later and graduate, if he/she passes all the subjects.
- (ii) A candidate who fails any of the resit examination shall be required to undergo appropriate clinical posting and sit at the next University Examination.

**F. DEGREE CLASSIFICATION:**

- (i) The degree of M.B.B.S. shall be unclassified
- (ii) Distinction shall be awarded to students obtaining 70% and above in any subject.