

**KADUNA STATE UNIVERSITY**  
**(KASU) KADUNA**  
**COLLEGE OF MEDICINE**  
**FACULTY OF ALLIED HEALTH SCIENCES**



**DEPARTMENT OF**  
**MEDICAL LABORATORY**  
**SCIENCES**  
**STUDENTS' HANDBOOK**  
**FOR**  
**BACHELOR OF MEDICAL LABORATORY SCIENCE**  
**UNDERGRADUATE STUDENTS**  
**SEPTEMBER 2020 (1<sup>ST</sup> EDITION)**

## **TABLE OF CONTENTS**

### **LIST OF MEMBERS OF GOVERNING COUNCIL AND UNIVERSITY OFFICIALS MEMBERS OF THE GOVERNING COUNCIL**

Mallam Hussaini Dikko	Pro-Chancellor & Chairman
Professor Abdullahi I. Musa	(VC) Member
Dr. Abdulkadir A. Mayere	Member
Dr. Sanusi A. Isma'il	Member
Hon. Habibu Sani	Member
Mrs. Charity U. Shekari	Member
Dr Halliru Musa Soba (Perm. Sec. MOE)	Ex-Officio Member
Mallam Mahmoud A. Shuaibu (Perm. Sec. MOF)	Ex-Officio Member
Professor Sadiq G. Abdu (Rep. Senate)	Member
Professor Helen A. Andow (Rep. Senate)	Member
Mrs. Florence Suleiman (Rep. Congregation)	Member
Pst. Sarah Omakwu	Member
Mal. Lawal H. Ajo (Rep. NUC)	Member
Barr Samira Umar Balarabe (Registrar)	Secretary

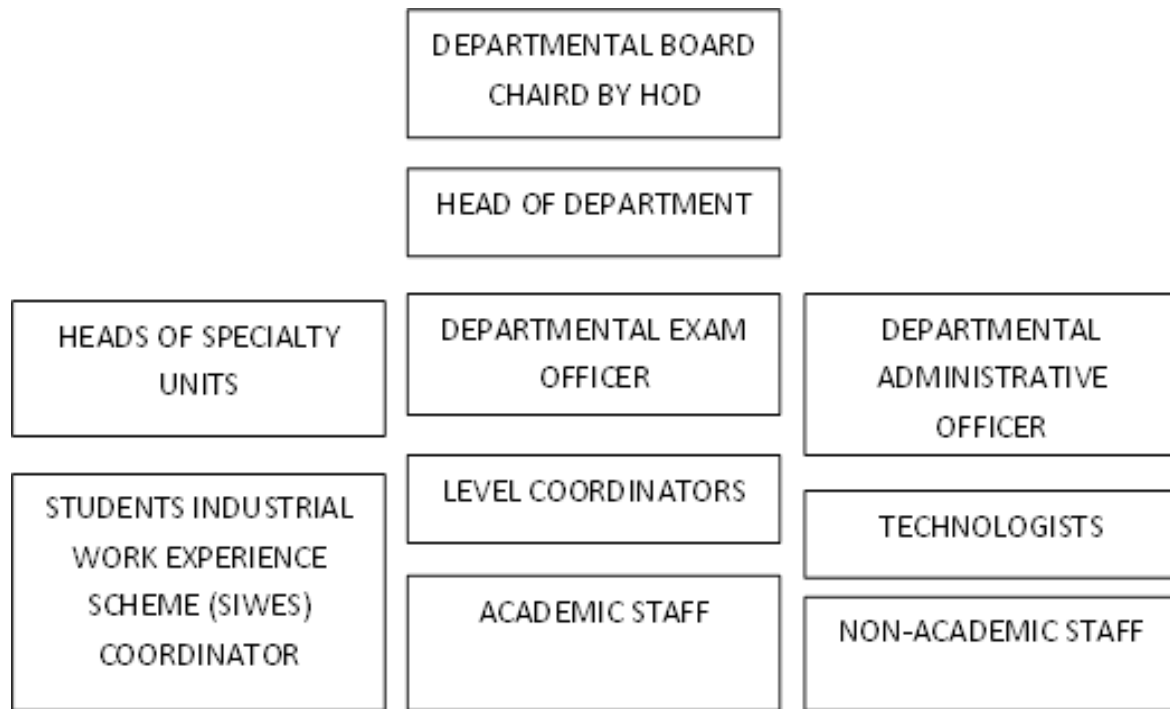
### **UNIVERSITY OFFICIALS**

His Excellency, Executive Governor of Kaduna State	
Mallam (Senator) Uba Sani	Visitor
HRH Mallam Sanusi Lamido Sanusi	Chancellor
Mallam Hussaini Dikko	Pro Chancellor
Professor Abdullahi Ibrahim Musa	Vice –Chancellor
Barr. Samira Umar Balarabe	Registrar
ajia Hauwa'u Dalhat	Bursar
Dr Umar Babangida Dangani	Librarian

### NAMES OF DEPARTMENTAL STAFF

S/NO.	NAME	RANK	NATURE OF APPOINTMENT
1	Armiyau Ahmad Yelwa	Lecturer 1 (Ag HOD)	Full time
2	Dr Isah Abubakar Aliyu	Associate Professor	Visiting
3	Sarah Nuhu Kase	Lecturer 1	Full time
4	Dr Khadija Abdullateef	Lecturer I	Full time
5	Aminu Yusuf	Lecturer II	Full time
6	Suleiman Abdulkadir Saeed	Lecturer II	Full time
7	Maryam Ibrahim Rimi	Lecturer II	Full time
8	Adamu Muhammad Bashir	Lecturer II	Full time
9	Garba Ninani	Lecturer II	Full time
10	Haruna Sambo Danlami	Lecturer II	Full time
11	Jamila Suleiman Ibrahim	Assistant Lecturer	Full time

## ORGANOGRAM OF THE DEPARTMENT



## **PREFACE**

The Department of Medical Laboratory Science, Faculty of Allied Health Sciences, Kaduna State University was established in 2019. National Universities Commission (NUC) resource verification was done in November 2019 and approval from NUC was given in 2020. The first set of students were admitted into the University for 2019/2020 Academic session. The regulatory body, Medical Laboratory Science Council of Nigeria, visited the department for Advisory visit in June/July, 2020. The Council required the Department to be well established in the Faculty and University at large. They however, made some vital observations and recommendations. The report was forwarded to the appropriate authority for immediate action.

Dr Isah Abubakar Aliyu was appointed as the first Head of Department. The HOD appointed Head of Units, level coordinators, exams and time table officers as well as the needed departmental committees. All of which were inaugurated for effective transformation of the department into an accredited unit of the Faculty of Allied Health Sciences.

This handbook contents, applications and clarity of expression is devoid of ambiguity. It is detailed and more inclusive in terms of the rules and regulations on all matters of the Department. It is imperative that members and students should endeavor to regularly familiarize themselves with, seek counsel as appropriate, and be current on the various provisions guiding their operations, relationships, responsibilities, rights, privileges and expectations.

## **INTRODUCTION**

Medical Laboratory Science is a dynamic professional programme designed to provide a broad basis of fundamental scientific knowledge and its applications, such that the graduands of the programme would be well equipped to meet the changing needs of modern scientific knowledge in Health care and to enable them proceed for further training.

The courses offered are designed to expose the students to core areas of Chemical Pathology (Clinical Biochemistry, Clinical Chemistry), Haematology and Blood Transfusion Sciences, Histopathology, Medical Microbiology, Immunology and / or Immuno-Chemistry as well as Instrumentation and Techniques.

Students are required to broaden their knowledge by taking ancillary courses in Chemistry, Biology, Physics, Mathematics, Statistics, Biochemistry, Anatomy, Physiology Pharmacology and GST. They are also expected to understand the working of laboratory instruments and existing techniques and modify them where applicable. The practical aspect of the degree programme prepares the students to fit into any diagnostic laboratory in hospitals, research institutes, food laboratories, entrepreneurship, supply chain of quality reagents/equipment and other allied fields. Successful completion of the programme leads to the award of the degree of Bachelor of Medical Laboratory Science (BMLS).

## **UNIVERSITY VISION**

The vision of Kaduna State University is to become a University of the world class standard with excellence in applied Sciences and sustainability studies.

## **MISSION OF THE UNIVERSITY**

The Mission of the Kaduna State University is to provide all-round University education of the highest standard for the development of the individual and the State, while inculcating the spirit of love, tolerance, understanding and Unity in the State in particular and the Country in general.

## **UNIVERSITY PHILOSOPHY**

The Kaduna State University shall promote excellence in knowledge acquisition through teaching, research and community service and to fully foster innovation and creativity by taking full advantage of globalization and knowledge based economy. It shall maintain the international character of a university and uphold the ideals of the community within which it is situated and at the same time promote unity in Kaduna State and the nation at large.

## **UNIVERSITY OBJECTIVES**

The broad objective of Kaduna State University is to produce Competent and qualified graduates with strong moral and academic standing. The specific objectives are:

- i. To encourage the advancement of learning and to hold out to all persons without distinction of race, creed, sex or political conviction, the opportunity of acquiring a higher and liberal education.
- ii. To provide courses of instruction and other facilities for the pursuit of learning in all its branches and to make those facilities available on proper terms to such persons as are equipped to benefit from them.
- iii. To encourage and promote scholarship and conduct research in all fields of learning and human endeavor.
- iv. To relate its activities to the social and economic needs of the people of the State and the Nation at large.
- v. To undertake any other activities appropriate for a University of the highest standard.

## **PHILOSOPHY OF THE PROGRAMME**

The broad philosophies of training in medical laboratory sciences are to:

- a) Provide sound academic and professional background for the production of Medical Laboratory Scientists who would be capable of working anywhere in Nigeria.
- b) Produce Medical Laboratory Scientists who would satisfy internationally recognized standards and who would undertake further training towards specialization.

- c) Produce Medical Laboratory Scientist with sufficient management ability to play a leadership role and entrepreneurship in employing others, establishing self, and also in training and general practice of laboratory sciences.

### **OBJECTIVES OF THE PROGRAMME**

The main aims of the bachelor honors degree programme in Medical Laboratory Sciences are to:

- i. To instill in students a sense of enthusiasm for the profession; an appreciation of its application in different contexts (in an area such as general medicine, food and beverages, pharmaceutical industries, utility departments e.g. water corporations; research institution among others).
- ii. Involve the student in an intellectually stimulating and satisfying experience of learning, studying and research.
- iii. Provide students with a broad and balanced foundation of medical laboratory knowledge and practical skills; performing effectively in clinical diagnosis services, academic and quality assurance; and function independently or in collaboration with other members of the health team in the care of individual and groups at all level of health care.
- iv. Develop in students, the ability to apply their medical laboratory knowledge and skills to the solution of theoretical and practical problem in laboratory medicine.
- v. Develop in students through an education in medical laboratory science, a range of transferable skills of value in medical and non-medical employment.
- vi. Provide students with a knowledge and skills base from which they can proceed to further studies in specialized areas involving medical sciences.
- vii. To generate in students, an appreciation of the importance of the medical laboratory sciences in an industrial, economic, environmental, health and social context.
- viii. Generate students with the ability to produce biological and diagnostic reagents as well as being able to fabricate and maintain laboratory equipment.

### **ADMISSION REQUIREMENTS**

Candidates seeking admission into the Bachelor of Medical Laboratory Sciences (BMLS) programme in the Faculty of Allied Health Sciences must have passed the Secondary School Certificate Examination/West African Examination Council with Minimum of 5 credits in



English Language, Mathematics, Biology, Chemistry and Physics in not more than two sittings. Candidates can be admitted into the programme at 100 level or 200 level.

**A. UTME for BMLS Programme (100 level)**

- i) The compulsory UTME subjects are Biology, Chemistry and Physics. Candidates must obtain the appropriate cut - off points of the University in UTME.
- ii) Candidates entering into 100 level from College of Basic and Remedial studies (CBRS) must also have a minimum of 2.40 GPA as well as sit for UTME with not less than 200 points.

**B. Direct Entry Requirement for BMLS Programme (200 level)**

- i. Candidates must have a minimum of grade C pass at Advanced level in Biology, Chemistry and Physics together with 5 O/level passes at credit level.
- ii. **Board/Council Certified Diploma** in Medical laboratory technician (for BMLS), **Note:** Holders of Board/Council certified diplomas may be required to undergo an entry screening examination.
- iii. Minimum of 10 points for IJMB.
- iv. Candidates with a minimum of second class honors degree in any of the Basic sciences from a recognized university.

**DURATION OF PROGRAMME**

**Minimum duration**

The Bachelor of Medical Laboratory Sciences, shall run for a minimum period of five (5) academic sessions for entry through UTME and four (4) academic sessions for direct entry.

**Maximum duration**

Bachelor of Medical Laboratory Sciences; the maximum period of study permissible shall be nine (9) academic sessions for entry through UTME and eight (8) academic sessions for direct entry.

**Repeating a Class**

Students shall be allowed to repeat a class (level) only once. **Students shall not be allowed to repeat 100 level.**

## **ATTENDANCE OF LECTURES AND CONTINUOUS ASSESSMENT**

- i) All registered students of the faculty are expected to follow their given Time Table strictly and attend their lectures punctually as well as continuously. Except on health grounds, a student must have at least 75% lecture attendance in all registered courses to be eligible for any exams.
- ii) Continuous assessment constitutes 40% of the total marks while the end of semester exams is 60%.
- iii) Continuous Assessment can be given to the students at any time before the end of the semester

## **PROGRESSION FROM ONE LEVEL TO ANOTHER**

### **100 Level to 200 Level:**

Students must pass all the **core subjects** (Mathematics, chemistry, physics and biology). Scores obtained by a student in the courses under each **subject** shall be summed up and at least average of 40% shall be the pass mark for each **subject**.

### **200 Level to 300 Level:**

A student must pass all the courses registered at Level 200. Students who fail  $\leq 25\%$  (9 credit units) of the total credits registered at Level 200 shall **re-sit** the failed courses. A candidate who fails more than 25% to  $\leq 50\%$  (18 credit units) of the credits registered shall **repeat** the level **or** fails **any** re-sit exam. A candidate who fails more than 50% (18 credit units) of the credits registered would be advised to withdraw.

### **Note:**

1. **Computer Science and GST** courses are not determinants of progression but they are determinants of graduation (students shall be allowed to carry over Computer and GST courses).
2. For scores obtained by each student, an average of 50% shall be the pass mark for each course.
3. **Re-sit** students can only obtain a maximum score of 50% in each of the courses.

4. Any **withdrawal** decision reached at any level in any department is also withdrawal from the entire Faculty.

**300 Level to 400 Level:**

A student must pass all the courses registered at Level 300. Students who fail  $\leq 25\%$  (10.5 credit units) of the total credits registered at Level 300 shall **re-sit** the failed courses. A candidate who fails more than 25% to  $\leq 50\%$  (21 credit units) of the credits registered shall **repeat** the level **or** fails **any** re-sit exam. A candidate who fails more than 50% (21 credit units) of the credits registered would be advised to withdraw.

**400 Level to 500 Level:**

A student must pass all the courses registered at Level 400. Students who fail  $\leq 25\%$  (10) of the total credits registered (40) at Level 400 shall **re-sit** the failed courses. A candidate who fails more than 25% to  $\leq 50\%$  (20 credit units) of the credits registered shall **repeat** the level **or** fails **any** re-sit exam. If at the end of the repeated session, the candidate fails  $\leq 50\%$  (20 credit units) of the re-sit examination, he/she will be allowed to re-sit the failed courses. If he/she fails the re-sit examination, he/she will be withdrawn from the programme. **No candidate will be allowed to repeat a level twice from 200 to 500 levels.**

**500 Level (Final year):**

A student must pass all the courses registered at Level 500. Students who fail  $\leq 25\%$  of the total credits registered at Level 500 which is specialty specific, shall **re-sit** the failed courses. A candidate who fails more than 25% to  $\leq 50\%$  of the credits registered shall **repeat** the level **or** fails **any** re-sit exam. If at the end of the repeated session, the candidate fails  $\leq 50\%$  of the re-sit examination, he/she will be allowed to re-sit the failed courses. If he/she fails the re-sit examination, he/she will be withdrawn from the programme.

**Note:** All re-sit exams should be conducted a week after resumptions from end of session break.

## **LABORATORY COURSES AND POSTING**

Laboratory posting commences at three hundred level and should carry a three credit unit per semester. Clinical courses are taught at 300 – 500 levels.

Candidate must pass first and final professional examinations with the minimum average of 50% marks. At level 300-400 level general medical laboratory professional courses are taught, and students are to be examined during their first professional examination on the entire specialty of medical laboratory science. This is expected to be held at the end of second semester of 4th year. The final professional examination is to be taken at the end of final year and it is expected to be on the student area of specialty.

## **REGISTRATION/ INDEXING OF STUDENTS WITH THE MEDICAL LABORATORY SCIENCE COUNCIL OF NIGERIA (MLSCN)**

The Faculty/department is expected to register with the council for both **UTME** and **DE** students before the end of 300 level. The registration is recognized as the effective date for the commencement of the programme and it also determines when the student is due for the First and Final Professional Examinations, bearing in mind that the student must have fulfilled the university requirements to proceed to 400 level and 500 levels respectively.

### **Registration with the MLSCN entails:**

- i. Completion of a student registration Enrolment form which must be endorsed by the Head of Department, who must be a member of the council.
- ii. Payment of prescribed fees
- iii. Presentation and screening of credentials for eligibility
- iv. Eligible students are then enrolled as a student Medical Laboratory Scientists with student registration number assigned
- v. Student enrolment letters are sent through the Dean or Head of Department
- vi. Students that fail the screening would be advised to withdraw from the programme forthwith.

## EXAMINATION

### EXTERNAL EXAMINATIONS

The first professional examination (Year 4) and the final (Year 5) shall be moderated by external examiners in accordance with existing examination regulations of Kaduna State University

### PRE-REQUISITE AND CONDUCTION OF FIRST AND FINAL PROFESSIONAL EXAMINATIONS AT 400 AND 500 LEVELS RESPECTIVELY

- a. Attendance policies
- b. Laboratory posting
- c. Format of examinations/examiners
- d. Council pass mark

**(a) Attendance Policies**

At least 75% attendance is mandatory for all phases of the programme.

**(b) Laboratory Posting**

As earlier highlighted laboratory posting is compulsory for all medical laboratory science students. Laboratory posting started from 300-500 levels, at least 75% attendance is compulsory and is a prerequisite for writing the professional examinations. The clinical laboratory posting should only be performed in a MLSCN accredited laboratories.

**(c) Format of Professional Examination**

Students are examined in two phases:-

1. First Professional Examination (400 level) consisting of:

- Laboratory Posting Assessment - 20 marks
- Multiple Choice Questions (MCQs) In all the disciplines - 20 marks
- Practical Examination and spot test of not less than 3 hours in all the disciplines-50 marks
- Oral/Viva in all the disciplines - 10 marks

100 marks

2. Final Professional Examinations (500 Level):

- Laboratory Posting Assessment - 20 marks
  - Multiple Choice Questions (MCQs) - 20 marks
  - Practical Examination and spot test of not less than 3 hours in the candidate's speciality - 50 marks
  - Oral/Viva in the candidate's specialty - 10 marks
- 100 marks

A student who failed a professional examination shall repeat the failed component of clinical posting in the next session. There is **no re-sit** for failed clinical examination in Medical Laboratory Science

**CRITERION FOR PLACEMENT INTO VARIOUS SPECIALTIES**

Students are placed into respective specialties based on performance in the departmental core courses of 400 level (Chemical Pathology, Haematology, Histopathology, Medical Microbiology) other than clinical courses.

**LABORATORY REQUIREMENT FOR MEDICAL LABORATORY SCIENCE  
TRAINING**

Considering the different specialties the department has, each specialty required a laboratory for conducting practical for its students; this will provide a smooth process for acquainting and training the students with the best practical approach. Therefore, the Medical Laboratory Science Council of Nigeria recommends provision of 8 laboratories which include:

- 1 Haematology Laboratory
- 2 Chemical Pathology Laboratory
- 3 Medical Bacteriology Laboratory
- 4 Medical Parasitology and Entomology Laboratory
- 5 Histopathology Laboratory/cytopathology Laboratory
- 6 Medical Virology Laboratory/ Immunology Laboratory

7 Molecular Biology/Biotechnology Laboratory

8 Tissue Culture/Cell Biology Laboratory

### **ORIENTATION OF NEW STUDENT**

The Faculty of Allied Health Sciences organizes and unanimously welcome her student into various departments of the faculty. However, the students are encouraged to work very hard, wake up to their responsibility as students and be the best. This gives an opportunity for Staff and the new students to interact with each other.

### **EXAMINATIONS**

#### **Conduction of Examinations in the University**

#### **Attendance of Lectures and Continuous Assessment**

- iv) All registered students of the faculty are expected to follow their given time table strictly and attend their lectures punctually as well as continuously. Except on health grounds, a student must have at least 75% lecture attendance in all registered courses to be eligible for any exams.
- v) Continuous assessment constitutes 40% of the total marks while the end of semester exams is 60%.
- vi) Continuous Assessment can be given to the students at any time before the end of the semester. No student is allowed to be absent without any genuine and approved reason.
- vii) At the end of each semester, examinations are conducted for courses taught in various departments. Such examinations may take the form of written papers, oral examination, practical submission and defense of written projects or any combination as approved by the University Senate.
- viii) The timetable for the examinations shall be fixed on the various notice boards in the University stating the time and venues of all examinations.
- ix) Students who have clashes in the examination schedule should immediately intimate their departmental/faculty examination officers

- x) Students who fail to intimate the appropriate officers of the University of Impending Clashes in examination schedules shall hold themselves responsible for any difficulty that may arise.
- xi) Continuous assessment during course work shall be included in determining the final score of candidates in the examination results.
- xii) Any student who absents himself/herself from any examination without University approval and has not withdrawn from the course of study shall be graded 'F' for such course(s) and the grade(s) shall be reflected in the calculations of his/her GPA for that semester or session
- xiii) Subject to the approval of the Senate, the University may grant concessions to student(s) who could not complete or sit all the examinations due to certified illness or other exigencies acceptable to the Senate.
- xiv) Without prejudice to the regulations cited under academic affairs, the University reserves the right under the law establishing the University to decide finally on all academic matters.
- xv) Students who satisfy the requirements for examinations shall be issued with an exam card, which shall be presented to the invigilator in all examinations.
- xvi) No student shall be allowed to enter the examinations hall without the University identity card and Examination card.
- xvii) A candidate shall not be allowed to enter the examination hall if he or she is more than 30 minutes late only if the invigilator is satisfied with the reason for the lateness and shall not be allowed extra time at the end of the examination
- xviii) A candidate shall not be allowed to leave the hall within 45 minutes after the commencement of an examination except under exceptional circumstances approved by the Head of Department or the examinations officer.
- xix) On entering the examination hall, it is the responsibility of the candidate to draw the attention of the invigilator to any paper or material on his/her seat, table or on the floor around him/her to enable for such material to be removed before the examination starts.



- xx) A candidate shall deposit any handbag, brief case, books, handout, etc. outside the examination hall or in front of the invigilator before the commencement of an examination.
- xxi) All electronic equipment, GSM handsets, calculators are not allowed into the examination hall except where a specific item is allowed for the paper.
- xxii) A candidate shall comply with the instructions to candidates as set out in the question paper and answer book or other materials supplied.
- xxiii) A candidate shall use only the answer books provided and also comply with any instructions given by the invigilator.
- xxiv) All rough work must be crossed out neatly before a candidate finally submits his/her script to the invigilator. Note that rough work should only be done in the answer booklet.
- xxv) Under no circumstance shall a candidate write anything other than his/her admission number and name on the question paper. Supplementary answer sheets or book, even if they only contain rough work must be neatly packed into the answer booklet.

### **ACADEMIC MISCONDUCT**

- i. A candidate shall not remove or mutilate answer booklet or any other material or paper supplied, whether used or not except that he may remove from the examination hall at the end of the examination, the question paper if the removal or mutilation relates to answer booklets the candidates shall be liable to rustication for 1 session.
- ii. Until candidates are allowed to leave the examination room, no copy of any question paper shall be removed from the examination hall. Any candidate who removes any question paper from the examination hall before the time, candidates are allowed to leave the examination hall shall be liable to rustication for one session.

- iii. In the event that a candidate for good cause has to leave the examination hall temporarily, he/she shall be accompanied by the invigilator or security personnel on duty. A candidate shall neither sit for another nor procure another person to sit for him or any other candidates in any examinations conducted by this University. Such conduct amount to great misconduct and shall attract expulsion from the University.
- iv. In the course of writing an examination conducted by this University, a candidate shall neither give nor accept any assistance whatsoever from any other candidate or person from within or outside the examination hall. A breach of this regulation shall attract rustication or cancellation of the candidate's paper and may further attract further action from the senate.
- v. Smoking is not permitted inside the examination hall and the cigarette or pipe being smoked shall be seized by the invigilator or any security personnel authorized by him and the erring candidate shall be liable to rustication for a session.
- vi. At the end of the time allocated for an examination, a candidate shall gather his/her scripts together neatly and hand them over to the invigilator. A candidate is responsible for the proper return of his/her scripts.
- vii. A candidate shall sign the attendance register at the commencement of the examination and at the end while submitting his/her answer scripts. In the event of any dispute arising as to whether or not a candidate sat for the examination and submitted his answer scripts, the signature on the attendance register shall be conclusive proof thereof.
- viii. A candidate shall not, either before or after an examination, threaten or blackmail an invigilator, lecturer, examiner, member of senate or committee or any other officer connected with the examination. Such a conduct is grave misconduct from Senate which may even lead to expulsion from the University.

For the avoidance of doubt, examination misconduct regulated by these rules shall also include the following:

- i. Substitution or alteration of answer scripts by any means after they have been submitted to the invigilator at the end of the examination.
- ii. Breaking into the house, office or vessel of an examiner, lecturer, invigilator or any other officer having anything to do with the marking or evaluation of the performance of candidates at an examination center conducted by this University.
- iii. Obtaining, procuring or possessing by any means a preview of questions intended for any examinations being conducted by this university before its due date and time.
- iv. Any other misconduct related to examinations conducted by the University, which the Senate may from time to time consider as examination misconduct.
- v. Any candidate found to have breached or committed any of the examination misconducts shall be liable to rustication for at least two semesters expulsion as determined by Senate after due process.

## **REGULATIONS GOVERNING ORGANIZATION, CONDUCT AND DISCIPLINE OF STUDENTS**

### **General conduct**

1. Students are advised to take good care of their personal belongings. The University will not be responsible for any damage to or loss of personal effects.
2. Absence from lectures, tutorials or practical classes requires the approval of heads of departments and the Deans concerned.
3. Students are not allowed to consume, keep, sell or indulge in alcoholic drinks in the University premises. Students caught contravening this provision shall be made to face Disciplinary Committee.
4. Students are not allowed to consume, keep or sell illicit drugs within the University premises. Students caught indulging in this act shall be handed over to the police.

- Attention is particularly drawn to penalty of decree 2 of 1984 of the Federal republic of Nigeria. If convicted, the student will automatically cease to be a KASU student.
5. Students caught with firearms within the premises of the University shall be handed over to the police. If convicted the student shall cease to be a KASU student.
  6. Students shall not indulge in physical combat in the University. Students who violate this provision may face civil offence prosecution by the police.
  7. Students shall not take laws into their hands. Any student who takes laws into his/her hands shall face civil offence prosecution by the police.
  8. Nudity is not allowed on the University campuses. Any student caught contravening this regulation shall face civil offence prosecution.
  9. Any student caught stealing within the University community shall be handed over to the University Security Division to face criminal prosecution by the police
  10. Political parties and their activities are not allowed on campus but as citizens of the country, students are free to belong to any political party of their choice.
  11. Any student accused of rape shall be handed over to the police and would be liable to expulsion from the University if convicted by a law court.
  12. Any student caught forging any document relevant to his/her admission shall be expelled from the University and if already graduated, the degree certificate will be withdrawn.
  13. Student who appears before the relevant University committees and gives false evidence that may mislead the University authority shall be liable to serve punishment
  14. Students are responsible for the conduct of their visitors within the premises of the University.
  15. Students who indulge in sexual harassment of fellow students and other members of the University community shall be liable to severe punishment or even expulsion
  16. Cultism is prohibited in the University. Students caught conducting cultist activities on campus shall be expelled.

## **DRESS CODE**

Students are strongly advised to dress decently to reflect the civilized institution that is the University. Decent dressing is a prerequisite for attending lectures, practical, tutorials, workshops, seminars and such other functions within the University. Indecent dressing includes among others, the wearing of short, skimpy dresses like body hugs, spaghetti and transparent wears by all students as well as the plaiting or weaving of hair and putting on earrings by the male students specifically. Students contravening this rule would be sent out of the University.

## **ABSENCES**

### **Absent from course work and examination**

Any student planning to be away from the university when the university is in session shall submit a written application for it to be processed and reply given before the set date for the planned trip.

### **Illnesses**

Any student that is ill and cannot partake in academic activities has to provide a medical summary of his/her condition, which should be duly signed and stamped by a doctor from the University Health Services.

## **HEALTH FACILITIES**

The KASU Sick Bay is functional and equipped to deal with minor injuries and illnesses. Referrals for major cases are made to Barau Dikko Teaching Hospital (BDTH). All students are required to register with the medical center.

## **PERFORMANCE EVALUATION CRITERIA**

The procedures for the assessment of students in Allied Health Science will correspond with the knowledge, abilities and skills to be developed through the training program. These include the following:

- Written examination
- Laboratory report
- Planning execution and reporting of project work
- Essay assignments
- Literature surveys and evaluation
- Collaboration project work
- Seminars/project presentation

### **LABORATORY SAFETY**

Biological research may involve the handling of living or dead organisms that are harmful to man. It may also involve the use of toxic or corrosive materials. Therefore:

- i. Students are required to obey laboratory safety rules and signages to avoid preventable accidents.
- ii. As part of the safety measures, all students are expected to wear as instructed, their complete Personal Protective Equipment (PPE) when in the Laboratory for Practical.

### **FUNCTIONS OF LEVEL COORDINATORS**

There shall be for every level of undergraduate studies a coordinator to serve as an adviser to the students of that particular level on matters relating to their academic affairs, discipline and social life in the campus.

Level coordinators performs the following functions:

- a. To ensure that a candidate offered fresh admission met all the stipulated requirements before he is cleared for registration.
- b. To ensure that a returning student is not withdrawn from the University as a result of poor academic performance or examination misconduct before issuing clearance to him to register for any particular session.

- c. To inform and Paste the courses students are to register for the session in a conspicuous place including correct courses codes, course titles and the total credits applicable for the session which must be dated and endorsed by the head of department.
- d. To be familiar with all the students he/she is coordinating and to also act as their mentor as well as have full details of students' personal and academic records (including screening for entry qualifications).
- e. To guide students on the proper way to communicate with university authorities in cases of sickness, maternity leave, travelling, suspension of studies and other complaints that are related to their academic pursuit
- f. To ensure that before signing the course registration form, each student must have correctly registered the courses he/she is supposed to register for, including carry over courses before the portal is closed at the beginning of every session.
- g. To make sure Proper documentation of academic records of students is done, including approved suspension of studies, repeat, rustications and transfer.
- h. To obtain and keep mobile phone numbers of students and their parents, guardians for ease of communication in terms of need.
- i. To collate prepare and present student results in the correct format approved by the university to the departmental board of examiners under the guide of departmental examination officer
- j. To Prepare and issue students with end of session academic report which must be signed by the head of department and examination officer immediately results are approved by the university senate.
- k. To undertake such other matters as may be assigned to him by the Head of Department for the level he is coordinating.

### **FUNCTIONS OF DEPARTMENTAL EXAMINATION OFFICER**

Departmental examination officer shall perform the following functions

- a. To prepare departmental lecture time table at the beginning of each semester
- b. To prepare departmental examination time table and invigilation schedule at the end of each semester

- c. To collect results from servicing department within the faculty and from faculty examination officer for in the case of results coming from other servicing faculties and forward same to the level coordinators.
- d. To prepare and present department results at the faculty board of examiners meeting in the format approved by the university.
- e. To report all cases of examination misconduct to the faculty examination misconduct committee immediately.
- f. To liaise with faculty examination officer in handling all cases of result verification.
- g. To liaise with level coordinators to properly guide students on university examination regulations.

#### **PROHIBITION OF CHANGE OF NAME AND DATE OF BIRTH**

A student shall only use the name and date of birth with which he is admitted/transferred into the university and which appears on the certificates used to secure the admission. This name and date of birth shall be used in all certificates and transcripts, respectively to be issued by the university.



## COURSE OUTLINE

### 100 LEVEL COURSES - FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	BIO 101	General Biology 1	2
2	BIO 103	General Biology laboratory	1
3	CHM 101	General Chemistry	2
4	CHM 103	Inorganic Chemistry	2
5	CHM 105	First year Practical Chemistry 1	1
6	CSC 111	Introduction to Computer Science	2
7	GST 101	Communication in English	2
8	GST 103	Nigerian Peoples and Culture	2
9	GST 125	Contemporary Health issues	2
10	MTH 107	Sets and number system	2
11	PHY 101	General Physics Laboratory 1	1
12	PHY 103	Mechanics, thermal physics and waves	3
		<b>TOTAL</b>	<b>22</b>

### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	BIO 102	General Biology II	2
2	BIO 104	General Biology Laboratory II	1
3	CHM 104	Introductory Organic Chemistry	2
4	CHM 106	First year Practical Chemistry II	1
5	CHM 108	Introductory Physical Chemistry	2
6	GST 102	Use of Library, study skills and ICT	2
7	GST 104/106	Communication in French or Arabic	2
8	PHY 102	Electronic, Magnetism and Modern Physics	3
9	PHY 104	General Physics Laboratory II	1
		<b>TOTAL</b>	<b>16</b>

**TOTAL CREDITS = 38**

### 200 LEVEL COURSES- FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	ANT 213	Gross Anatomy of upper and lower limbs	2
2	ANT 211	Histology of basic Tissues	1
3	ANT 215	Embryology and Medical Genetics	2
4	BCH 251	General Biochemistry 1	1
5	BCH 253	General Biochemistry II	2
6	BCH 255	Cell Biochemistry and introduction to metabolism	2
7	HPH 221	General principles, Blood and Body Fluids	2
8	HPH 223	Cardiovascular and Respiratory Physiology	2
9	HPH 225	Endocrine and Reproductive Physiology	2
10	GST 201	Communication in English	2
11	GST 203	History and Philosophy of science	2
12	AHS 301	Biostatistics	2
		<b>TOTAL</b>	22
	*CSC 111	Introduction to Computer Science for DE	2

**\*For Direct Entry students who have not taken the course at 100 Level**

### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	ANT 222	Gross Anatomy of Thorax, Abdomen, Pelvis and Perineum	3
2	ANT 224	Histology II	2
3	HPH 224	GIT ad Renal Physiology	2
4	HPH 226	Neuro-Physiology and special senses	2
	HPH 222	Practical Physiology	1
5	BCH 252	Biochemical methods	2
7	BCH 254	General metabolism	2
8	BCH 256	Enzymology	2

9	BCH 258	General biochemistry practicals	1
10	MMB 202	Medical Microbiology and Parasitology	3
11	GST 204	Peace, Studies & Conflict Resolution	2
12	GST 202	Logic Philosophy and Human Existence	2
		Total	24

**TOTAL CREDITS = 46**

### **300 LEVEL COURSES**

#### **FIRST SEMESTER**

<b>S/N</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credit Value</b>
1	PAT 301	General Pathology	3
2	PCL 313	Basic and autonomic Pharmacology	2
3	MMB 301	General Microbiology II	3
4	MLS 301	Introduction to Medical Laboratory Science	2
5	MLS 303	Medical Physics	2
6	MLS 305	Laboratory Posting	3
7	ANT 311	Human Anatomy III	2
8	ENT 301	Introduction to Entrepreneurship Skills	2
		<b>TOTAL</b>	<b>19</b>

#### **SECOND SEMESTER**

<b>S/N</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credit Unit</b>
1	MLS 302	Immunology I	3
2	MLS 304	Medical Laboratory Science Ethics	2
3	MLS 306	Laboratory Posting	3
4	MLS 308	Biomedical Engineering	3
5	MLS 310	Medical Laboratory Management and Supply Chain	3

6	MLS 312	Instrumentation in Medical Laboratory Science	3
7	PCL 314	Chemotherapy and Systemic Pharmacology	3
		<b>TOTAL</b>	<b>20</b>

**TOTAL CREDITS = 42**

### 400 LEVEL COURSES

#### FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	HEM 401	Basic Haematology	3
2	HEM 403	Basic Immunohaematology	3
4	MMB 401	Basic Bacteriology/Mycology	3
5	PTH 401	Basic Histopathology	3
6	MMB 405	Basic Medical Parasitology and Entomology	3
7	CHP 401	Basic Chemical Pathology	3
8	MMB 407	Basic Virology I	2
10	*MLS 402	Laboratory Posting	-
		<b>TOTAL</b>	<b>20</b>

#### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MLS 402	Laboratory Posting	6
2	MMB 402	Microbial Genetics	2
3	PTH 402	Forensic Science I	3
4	MLS 404	Molecular Biology I	3
5	MLS 406	Immunology II	2
6	MLS 408	Point of Care Testing	2
7	CHP 402	Chemical Pathology	2
8	ENT 402	Business Creation and Growth	2
<b>TOTAL</b>			<b>20</b>

**TOTAL CREDITS = 40**

**500 LEVEL COURSES**

**CHEMICAL PATHOLOGY OPTION**

**FIRST SEMESTER**

<b>S/N</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credit Value</b>
1	CHP 501	Chemical Pathology I	3
2	CHP 503	Chemical Pathology II	3
3	CHP 505	Chemical Pathology III	3
4	CHP 507	Clinical Enzymology	3
5	MLS 501	Research Methodology	3
6	MLS 503	Molecular Biology II Techniques and Applications	3
7	MLS 505	Laboratory Posting	3
		<b>Total</b>	<b>21</b>

**SECOND SEMESTER**

<b>S/N</b>	<b>Course Code</b>	<b>Course Title</b>	<b>Credit Value</b>
------------	--------------------	---------------------	---------------------

1	CHP 502	Clinical Endocrinology	3
2	CHP 504	Clinical Toxicology	3
3	CHP 506	Advanced Chemical Pathology Techniques	3
4	MLS 502	Seminar	2
5	MLS 504	Laboratory Posting	3
6	MLS 506	Research Project	6
		<b>Total</b>	<b>20</b>

**TOTAL CREDITS = 41**

### HAEMATOLOGY OPTION

#### FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	HEM 501	Haematology I	3
2	HEM 503	Haematology II	3
3	HEM 505	Blood Group Serology I	3
4	HEM 507	Blood Group Serology II	3
5	MLS 503	Molecular Biology II Techniques and Applications	3
6	MLS 501	Research Methodology	3
7	MLS 505	Laboratory Posting	3
		<b>TOTAL</b>	<b>21</b>

#### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MLS 502	Seminar	2
2	MLS 504	Laboratory Posting	3
3	HEM 502	Cytogenetics	3
4	HEM 504	Advanced Haematological Techniques	3
5	HEM 506	Advanced Blood Group Serological Techniques	3
6	MLS 506	Research Project	6
		<b>TOTAL</b>	<b>20</b>

**TOTAL CREDITS = 41**

## HISTOPATHOLOGY OPTION

### FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	PTH 501	Histopathology I	3
2	PTH 503	Histopathology II	3
3	PTH 505	Histopathology III	3
4	PTH 507	Exfoliative Cytology	3
5	MLS 505	Laboratory Posting	3
6	MLS 501	Research Methodology	3
7	MLS 503	Molecular Biology II Techniques and Applications	3
		<b>TOTAL</b>	<b>21</b>

### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MLS 502	Seminar	2
2	PTH 502	Cytogenetics	3
3	PTH 504	Advanced Histopathology Techniques	3
4	PTH 506	Embalment and Museum Techniques	3
5	MLS 504	Laboratory Posting	3
6	MLS 506	Research Project	6
		<b>TOTAL</b>	<b>20</b>

**TOTAL CREDITS = 41**

## MEDICAL MICROBIOLOGY OPTION

### FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MMB 501	Medical Bacteriology I	3
2	MPR 501	Medical Parasitology I	3
3	MMB 503	Public Health Microbiology	2

4	MPR 503	Host-Parasite interactions and Helminthic infections	3
5	MPR 507	Advanced Parasitology/Epidemiology	3
6	MLS 503	Molecular Biology II Techniques and Applications	3
7	MLS 505	Laboratory Posting	3
8	MLS 501	Research Methodology	3
		<b>TOTAL</b>	<b>23</b>

### SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MMB 502	Pharmaceutical Microbiology and Advanced Techniques	2
2	MPR 502	Arthropods of human diseases	2
3	MLS 502	Seminar	2
4	MLS 504	Laboratory Posting	3
5	MMB 504	Advanced Medical Bacteriology/special topics	3
6	MMB 506	Modern Diagnosis of Bacterial Infections	3
7	MLS 506	Research Project	6
		<b>TOTAL</b>	<b>21</b>

**TOTAL CREDITS = 44**

### MEDICAL VIROLOGY/ IMMUNOLOGY OPTION

#### FIRST SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MVI 501	Cellular Immune response	2
2	MVI 503	Infections and Immunity	2
3	MMB 507	Public Health Microbiology	3
4	MVI 505	Immunology III	2
5	MLS 503	Molecular Biology II Techniques and Applications	3
6	MLS 501	Research Methodology	3
7	MLS 505	Laboratory Posting	3
		<b>TOTAL</b>	<b>18</b>



## SECOND SEMESTER

S/N	Course Code	Course Title	Credit Value
1	MVI 502	Basic Immunology Techniques	2
2	MLS 502	Seminar	2
3	MVI 504	Molecular Basis of Immune Response	2
4	MVI 506	ImmunoPharmacology	2
5	MMB 502	Medical Virology II	3
6	MLS 504	Laboratory Posting	3
7	MLS 506	Research Project	6
		<b>TOTAL</b>	<b>20</b>

**TOTAL CREDITS = 38**

## COURSE DESCRIPTIONS

### 100 LEVEL COURSES – FIRST SEMESTER

#### **BIO 101: General Biology I (2 Credit Units)**

Cell structure and organization, functions of cellular organelles, diversity, characteristic and classification of living cells, general reproduction, inter relationship of organisms: heredity and evolution, element of ecology, and types of habitat.

#### **BIO 103: General Biology Laboratory I (1 Credit Unit)**

The microscope; its parts and their function. Setting up and the use of microscope. Calculations related to its use. Equipment used in measuring abiotic factors. Observation and identification of cells in living tissues (i.e onion, blood, bone etc.) Cell morphology and its organelles, simple permanent tissues in plants such as parenchyma xylem etc. Cellular nature, organisation and characteristics of animal tissues such as connective tissues, skeletal tissues. Observation and identification of reproductive structures in unicellular organism like *Amoeba*, *Paramecium* and

multicellular organisms like Bryophytes, Pteridophytes (Filicinophytes), Gymnospermopytes and Angiospermophytes.

**CHM 101: General Chemistry (2 units)**

Atoms, Molecules, Elements and Compounds. Laws of Chemical combination. Chemical Equations and stoichiometry. The mole concept. Atomic structure and Modern electronic theory of atoms. Chemical Bonding, intermolecular forces and shapes of molecules. Properties of gases. Oxidation - reduction Reaction. Thermochemistry. General concepts of acids, bases and salts, hydration and hydrolysis. Weak and strong electrolytes.

**CHM 103: Inorganic Chemistry (2 units)**

Periodic Table: periodicity of elements - gradation of physical and chemical properties within the table. Hybridization and shapes of simple molecules. Comparison of chemistry of the elements of Groups I and II, Hydrogen and Halogens. Electronic structure: Energy levels, Electronic configuration and Quantum numbers. The first transition element series- Transition metal complexes: Nomenclature and Isomerism.

**CHM 105: First Year Practical Chemistry I (1 unit)**

Basic Apparatus, Terminologies, safety regulations. Basic working skills in the chemical laboratory. Acid-base titrations, Redox titrations, weighing and gravimetric analyses. Introduction and general laboratory instruction (aims, recording of data, assessment of work, performance of experiment, care of the laboratory, use of common chemicals, care of balances, safety in laboratory, fire and spillage of chemicals. Refer to the laboratory manual.

**CSC 111: Introduction to Computer Science (2 Credit Units)**

History of computing and computers; evolution of ideas and machines. Introduction to computing system; hardware; software; auxiliary equipment and consumables. Trends in computing technology; centralized computing and distributed computing. Computer, data, information, knowledge, intelligence and communication.

Program: Development, flow charts and algorithm, program objects. BASIC or VISUAL BASIC fundamentals.

### **GST 125: Contemporary Health Issues (2 Credit Units)**

Diet, exercise, organ failure, air – borne diseases, sexually transmitted disease, cancer and its prevention, sickle cell disease. HIV/AIDS; Introduction, epidemiology of HIV, natural history of HIV infection, transmission of predisposing factors of HIV, Impact of HIV/AIDS on the society, management of HIV infection, prevention of HIV. Drugs and Society; sources of drugs, classification of drugs, dosage forms and routes of drug administration, adverse drug reactions, drug abuse and misuse, rational drug use and irrational drug use. Human kinetics and health education; personal care and appearance, exercise and health, personality and relationship, health emotions, stress, mood modifiers, refusal to tobacco, alcohol and other psychoactive drugs.

### **GST 101: Communication in English (2 Credit Units)**

A General course to teach the use of dictionary as a language learning tool, Basic grammar, developing reading skills, comprehension and summary exercises, continuous writing, development writing skill and speaking skills.

### **PHY 101: General Physics Lab I (1 Credit Unit)**

The introductory course emphasizes quantitative measurements, treatment of measurement errors, and graphical analysis. Readings and repeated readings, best value, mistakes, discrepancy, systematic errors, detecting systematic errors; Use of the mean, Reliability measurements- Accuracy and Precision. A variety of experimental techniques will be employed. Simple experiments in mechanics, property of matter, heat, light and electricity are emphasized, which are relevant to 100 level courses.

### **PHY 103: Mechanics, Thermal Physics and Waves (3 credit Unit)**

Space and Time, Units and dimension, kinematics; Fundamental laws of Mechanics, static and dynamics; work and energy; conservation laws. Elasticity; Hooke's law, Young's Shear and Bulk Modulus, Hydrostatics; Pressure; Buoyancy, Archimedes Principle; Surface Tension; Adhesion, cohesion, capillarity, drops and bubbles. Temperature; heat; gas laws; Laws of Thermodynamics; Kinetic Theory of Gases. Sound; Applications.

### **MTH 107: Sets and Number Systems (2 UNITS)**

SETS: definition of a set, empty set, finite and infinite sets, equality of sets, subsets, union, intersection, universal set, difference and complements, venn diagram. Systemetric difference, De-Morgan Theorems. Inclusion-Exclusion principle. Elements of relations and functions.

Introduction to number systems and some of their properties: Natural numbers, integers, rationals, irrationals and reals. Order relations in the set of real numbers. Notion of open and closed intervals on the number line.

Complex Numbers: Defination of a complex number, addition, multiplication and division. Geometric interpretation, modulus and conjugation. Polar representations, De moivre's Theorem,  $n^{\text{th}}$  roots of a complex number,  $n^{\text{th}}$  roots of unity.

## **100 LEVEL - SECOND SEMESTER**

### **BIO 102: General Biology II (2 Credit Units)**

A generalized survey of the plant and animal kingdoms based mainly on study of similarities and differences in the external features, ecological adaptation of these forms.

### **BIO 104: General Biology Laboratory II (1 Unit)**

Observation and description of the morphological and diagnostic features as well as the differences among the different phyla of the plant, animal, archebacteria, fungi and Protista Kingdoms. Identification of the taxonomic hierarchy of the members of the above groups. Study of the structure and functions of their parts and habitats specification.

### **CHM 104: Introductory Organic Chemistry (2 units)**

Nomenclature and classification of organic compounds. Homologous series, hybridization of carbon atom to reflect tetravalency. Empirical and Molecular formula, Simple techniques of writing structural formulas. Types of organic reactions. The chemistry of Alkyl halides Alcohols, phenols, carbonyl compounds, carboxylic acid, and their derivatives, namely Esters, Amides, Acid chlorides, etc.

**CHM 106: First Year Practical Chemistry II (1 unit)**

Qualitative analysis of Inorganic anions and cations. Organic qualitative analysis. Refer to the laboratory manual.

**CHM 108: Introductory Physical Chemistry (2 units)**

States of matter; Properties of ideal and real gases; Kinetic theory. Introductory Thermochemistry; Chemical kinetics of first and second order reactions, Chemical equilibrium, buffer solutions, Hydrolysis constants and solubility products. Introductory Electrochemistry.

**PHY 102: Electricity, Magnetism and Modern Physics (3 credit units)**

Electric force, field and potential, Electric Flux and Gauss's theorem, capacitances, Current Electricity, Magnetic force. Magnetic effects of currents, Magnetic materials, Electromagnetic Induction, Alternating currents, Plank's constant and quanta of light energy, photoelectric effect, radioactivity, nuclear composition, Binding energy, nuclear fission and fusion. Thermionic emission, rectification by diode, the transistor.

**PHY 104: General physics Lab II (1 credit unit)**

The introductory course emphasizes quantitative measurements, treatment of measurement errors, and graphical analysis. Readings and repeated readings, best value, mistakes, discrepancy, systematic errors, detecting systematic errors; Use of the mean, Reliability measurements- Accuracy and Precision. A variety of experimental techniques will be employed. Simple experiments in mechanics, property of matter, heat, light and electricity are emphasized.

**GST 102: Use of Library, Study Skills and ICT (2 Credit Units)**

Definition of library, Library and education, Types of library, Types of library materials and their uses, Uses of catalogues, Classification, Bibliographic citations and referencing, Library automation: types of library software, application and management, advantages, disadvantages, challenges, Information and Communication Technology (ICT). Hardware Technology,

Software Technology, Input Devices, Storage Devices, Internet Services, E – Library: E-References, Databases and Digitization.

**GST 104: Communication in French (2 Credit Units)**

Introduction to French, Alphabet and numeric for effective communication (written and oral), Conjugation and simple sentence construction based on communication approach, sentence construction, comprehension and reading of simple texts.

**OR**

**GST 106: Communication in Arabic (2 Credit Units)**

Introduction to Arabic alphabet and writing systems, Elementary conversational drills, Basic reading skills, sentence construction in Arabic

**200 LEVEL COURSES – FIRST SEMESTER**

**ANT 213: Gross Anatomy of Upper and Lower Limbs (2 credit Units)**

Philosophy, Methodology, Language and general descriptive terms in Anatomy. Skin, fascia, muscles, bones, joints, bloodvessels, nerves, lymphatic, etc. The pectoral girdle and associated joints (Sternoclavicular, acromioclavicular). Muscles acting on the shoulder joint, The axilla and Brachial Plexus, The Anatomy of the Breast, Blood supply. Venous drainage and lymph drainage, Flexor and Extensor-Compartments of arm, The elbow joint, and muscle acting on it. The flexor and extensor compartment of the fore-arm, Wrist Joint, and muscles acting on it. The anatomy of the hand, The blood supply and Anastomosis of the upper limb (around 17 scapula, humerus, elbow and hand), Dermatomes of the upper limb. The front of the thigh I (Femoral triangle, femoral canal and hernia, subsartorial canal). The front of the thigh II: The medial side of the thigh; The gluteal region; The back of the thigh; The popliteal fossa; The front of the leg and the dorsum of the foot; The lateral side of the leg; The back of the leg; The sole of the foot (arches of the foot); The hip joint and the knee joint; The tibio-fibular joints, ankle joint and the joints of the foot. Dermatomes of the lower limb. Surface anatomy, applied and radiological anatomy of the upper and lower limb. Gross anatomy shall include classroom lectures and

dissection sections. Examinations shall include both written and practical examinations and viva-voce.

Man. The lower limb Introduction, lymphatic and venous drainage, blood supply of lower limb. The thigh-anterior medical posterior compartment, clinical aspects, drainage of limbs, the thigh — posterior compartment, popliteal fossa. The hip joint e.t.c. Leg-Anterior Lateral Posterior compartment. Dorsum of foot, knee joint and muscles acting on it. Inversion and Eversion. Ankle joint, muscles acting on it, dermatomes of the lower limb.

### **ANT 211: Histology of Basic Tissues (1 credit Unit)**

Introduction to histological techniques for light microscopy, units of measurements in microscopy. Components of the cell, cell cycle, chromosomes, protein secretion and transcription of DNA. General histology of the basic tissue; including special connective tissues, epithelial tissues, muscle tissues, nervous tissue, lymphoid tissues, cartilage, bone and blood. The course will have a laboratory component.

### **ANT 215: Embryology and Medical Genetics (2 credit Units)**

General embryology including Oogenesis, gametogenesis, development of ovarian follicle, ovulation, fertilization, cleavage, formation of blastocyst, implantation, folding of embryo, placentation that is formation and functions of placenta and umbilical cord; fetal membranes and development of limbs. Mitotic changes in oocytes, formation and function of the zonapellucida, follicular growth. Preovulatory menstruation, post-ovulation atresia. Spermatogenesis and the spermatozoa. Testis before and at puberty, seminiferous epithelium. Spermatogenic cycles and time rotations in spermatogenesis, cycles and seasons—puberty, oestrous and menstrual cycles, ovulation, pseudopregnancy and pregnancy, delays in reproduction. Fertilization- egg and sperm transport, capacitation, acrosome reaction and sperm penetration. Immediate response to sperm penetration, prenuclear development and syngamy. Errors of fertilization, fertilization in vitro. Pre-embryonic period- cleavage, embryonic cell differentiation, foetal membranes, implantation and formation of placenta at birth. Development of Cardiovascular system, Integumentary system, Respiratory system, Digestive system, Urological system. Developmental anomalies and clinical syndromes.

Introduction to genetics, chromosomal abnormalities, single gene disorders and multi factorial disorders.

**BCH 251: General Biochemistry I (1 Credit Unit)**

(Chemistry and Functions of Amino acids and Proteins)

Structure, properties and classification of amino acids; pH, pKa and buffer; Peptides. Reaction of specific amino acids; separation and sequence analysis of peptides; chemistry of proteins and enzymes including their basic structural levels, and types of bonds stabilizing them; Properties, functions, and classifications of proteins.

**BCH 253: General Biochemistry II (2 Credit Units)**

(Chemistry and Functions of Carbohydrates, Lipids and Nucleic acids)

Classification and physical properties of carbohydrate, structure of glucose: projection and perspective formulae; structure and properties of other monosaccharide; Chemistry, classification and properties of lipids, methods of analyses of lipids; lipoproteins, membranes and membrane structure. Chemistry of nucleic acid, (bases, sugars and phosphoric acids, nucleosides, nucleotides, and nucleic acids). The structure and roles of RNA and DNA.

**BCH 255: Cell Biochemistry and Introduction to Metabolism (2 Credit Units)**

Cell theory, Major cell organelles, their functions, and Preparation of subcellular fractions and methods for studying cellular components; Prokaryotic versus Eukaryotic cells. Elementary treatment of membrane structure (the fluid mosaic model) and functions in the eukaryotic cell; Definition and types of metabolisms; concept in Bioenergetics; Introduction to Glycolysis). Flow of energy and matter in the biosphere. The laws of thermodynamics and their applications to biological systems. Concept of free energy and free energy changes in biochemical processes. Endergonic and exergonic reactions. Thermodynamics of open systems; disequilibrium as a condition for life. Metabolic pathway as an open thermodynamic system. Concept of equilibrium and non-equilibrium reactions. High energy compounds and their importance in biochemical reactions, chemical potential, electrochemical potential. Electron transport chain and oxidative phosphorylation. Regulation of ATP production.



## **HPH 221: General Principles, Blood and Body Fluids (2 Credit Units)**

General physiology; Introduction to Physiology (different fields of physiology and their relationship with other field of science), homeostasis and control systems of the body, it also covers cellular physiology including cell structures and organelles, cell membrane, cell juncture, cellular transport passive and active, Dynamic resting membrane potentials and its causes, Electrolyte changes, Homeostasis and positive/negative feedback mechanism and its significance. Osmosis, diffusion, active transport, Cell organelles — forms and functions, Intracellular communications, receptors and ions channels. Cells signaling, introduction to path clamp technique.

Excitable Tissues and Autonomic Nervous System; Basis of RMP, AP, graded potentials, synapses types mechanism and properties, neuromuscular junction, Mechanisms of skeletal muscle contraction, structure of skeletal muscle, types of muscle fibers, types of contraction, excitability changes, ionic changes, mechanical changes, Metabolic changes, thermal changes. Fate of lactic acid, effect of successive stimuli tetanus, and effect of loading, Fatigue and its causes, comparison between skeletal, smooth and cardiac muscles. Electrophysiology of the heart, cardiac cycle, venous return, circulatory adjustment to exercise. General, origin, distribution and functions of parasympathetic and sympathetic nervous system, Pharmacology of autonomic nervous system, Classification, comparison between sympathetic and Parasympathetic, sympathetic, origin distribution, function. Parasympathetic origin distributed and functions, Types of automatic receptors and the receptors pharmacology, adrenergic fibers and receptor, distribution and catecholamine, sympathomimetics and sympatholytics, cholinergic fibers and receptors acetylcholine, sites cholinergic blockers, ganglionic blockers muscarinic and nicotinic receptors. Atropine, parasympathomimetics and parasympatholytics.

Blood, Immunology and blood vessels, general functions of blood, composition of blood, plasma proteins, types, origin and its functions. Red blood cells structure, functions, haemoglobin and its functions and haemoglobinopathies, Erythroperosis and factors affecting it, Aneamias, degradation of Haemoglobin, bilirubin and development of jaundice, Fe<sup>3+</sup> metabolism, Blood coagulation, bleeding time and mechanism of blood coagulation, clotting time, hemophilia and purpura, Role of Ca<sup>2+</sup> and platelets in blood coagulation. It also covers blood cells, classification, basis and type of immunity, role of lymphocytes, T-lymphocyte, immunoglobulins,

humoral and cell mediated immunity. It explains the basis of immunological diseases, blood groups and Blood transfusion. Arteries, arterioles, vein, venules, capillaries, Interstitial fluids (IF) and vessels through which they flow. Lymph and lymph vessels, Cerebrospinal fluid and its vessels.

### **HPH 223: Cardiovascular and Respiratory Physiology (2 Credit Units)**

Cardiovascular physiology; Functional anatomy of the heart, functional organization system of the CVS, cardiac properties, Cardiac cycle, study of cardiac cycle, ECG, pulse, heart sound, Jugular venous pulse, Innervations of the heart, heart rate and its regulation, Cardiac output and factors affecting it, Types of blood vessels, and peripheral resistance. Arterial blood pressure, types, factors affecting, maintaining and regulating it. Types of shock, Effect of haemorrhage, edema, types and causes. Pulmonary circulations, Coronary circulation, environmental effect on CVS, exercise, flight high altitudes, Heart failure, myocardial infarction. The basis of heart Automaticity (a) Sinoatrial node (pace maker) (b) Atrioventricular node (c) The Bundle of His, Starling experiment Heart Block, fibrillation, Refractory period of the cardiac muscle: Extra systole External manifestations of cardiac Activity: Apex beat, Heart Sounds, Control of cardiac activity, Nervous control, Reflex control: Intracardiac reflex responses – Reflex effects of the pericardium, reflex effects of the coronary pulmonary, atria and ventricular vessels, Effects of vascular reflexogenic zones, Reflex effects of visceral receptors. Effects of the cerebral cortex on cardiac Activity. Humoral control of Cardiac Activity, effects of electrolytes:  $K^+$  &  $Ca^{2+}$  ions, effects of neurotransmitters, effects of hormones: Thyroxine, insulin, Gonadal hormones, Adrenaline and nor adrenaline. Types of shock, Effect of haemorrhage, edema, types and causes. Pulmonary circulations, Coronary circulation, environmental effect on CVS, exercise, flight high altitudes, Heart failure, myocardial infarction.

Respiratory physiology; Introduction, general functions of respiratory passage, factors protecting respiratory alveoli. I.P.P. its significant, surfactant, respiratory work., lung volumes and capacities, vital capacities and its significant, Dead space, Neural regulation of respiration, peripheral, central and chemical regulation of respiration, centres of respiration in medulla oblongata, hypoxia, cyanosis, effect of high altitude on respiration, Role of respiratory system in maintaining Acid-Base Balance, effect of exercise on respiration, effect of diving on blood gases.

## **HPH 225: Endocrine and Reproductive Physiology (2 Credit Units)**

Physiology of pregnancy and endocrine-related changes: Pregnancy and fetal development, physical and physiological changes of pregnancy. The antenatal period: Antenatal medical team, antenatal care. Complications of Pregnancy: ectopic pregnancy, gestational diabetes, pre-eclamptic toxemia, eclampsia, ante partum hemorrhage, placenta-previa, Back pain, Sacroiliac joint dysfunction, sciatica, pregnancy associated osteoporosis, nerve compression syndromes (carpal tunnel syndrome, posterior tibial nerve compression), circulatory disorders (varicose veins in the legs, hemorrhoids, muscle cramp, thrombosis and thromboembolism). Physical and physiological changes of labor: the stages of labor, signs of labor, normal labor and delivery, labor pain and causes of labor pain, the effect of labor on maternal and fetal physiology, the effect of labor on the pelvic floor and perineum, the duration of labor, positioning in labor.

An in-depth explanation into the Female genital system structure, structure of ovary, graafian follicle, structure of uterus fallopian tubes, mechanism of female puberty, ovarian cycle, oogenesis, menstrual cycle, vaginal cycle, ovulation, female contraception hormones, control of pregnancy, factor maintaining pregnancy, formation of placenta, functions and hormones of placenta, delivery, mechanism and hormonal control, hormones acting on female breast, mechanism of lactation, prolactin hormone abnormalities of lactation. It also discusses the male genital organ, structure of testis, spermatogenesis, hormonal control and temperature, function of testosterone hormone, mechanism of male puberty sperm and sperm count. physiology of menopause, coitus, fertilization physiological abnormalities of human reproduction:- pubescence abnormalities, chromosome Abnormalities, abnormalities of genital tract, differentiation, infertility, Abnormalities of menstrual cycle: - Secondary amenorrhoea, dysmenorrhoea, oligomenorrea, menorrhagia, metrorrhagia, Eunuchoidism.

General functions of hormones, nature of hormones, mechanisms of action and control. Hypothalamic releasing factors, pituitary glands anterior, pituitary posterior hormone functions, hormones, function and control G.H function and its abnormalities, and other releasing factors under control of hypothalamus, thyroid gland hormones T3 and T4 physiological function and its abnormalities, Adrenal (minerals corticoids, glucocorticoids and sex hormones), Adrenal cortex structure and hormones steroid hormones, functions and its abnormalities. Medullary Hormones,  $Ca^{2+}$  functions and homeostasis, Hormones regulating serum calcium (PTH, Calcitonin, 21, DH

cholecalciferol, pancreatic hormones, hormones Rosulates glucose, dialect mellitus, pineal gland hormones, melatonin.

**GST 201: Communication in English II (2 Credit Units)**

Logical presentation of papers, An introduction to Phonetics and Phonology, Introduction to Lexis and Structure, Art of Public Speaking and Oral Communication, Figures of Speech, Précis and Report Writing.

**GST 203: History and Philosophy of Science (2 Credit Units)**

Man; his origin and Nature, Man and his Cosmic Environment, Scientific Methodology; Science, Technology in Society and Service of Man, Renewable and Non-renewable Recourses – Mann and his Energy Resources, Environmental effects of Chemicals, Plastics, Textiles, Wastes and other Resources, Chemicals and Radiochemical Hazards, Introduction to the various areas of Science and Technology; Elements of Environmental Studies.

**AHS 201: Biostatistics (2 Credit Units)**

Aims, characteristics and application of biostatistics in clinical and preventive medicine. Statistical data in biomedical sciences, samples, population variables, frequency distribution, vital and descriptive statistics, measurement of central tendencies — mean, median mode, dispersion, standard deviation and co- efficient of variation. Collection and presentation of data, probability distribution, Hypothetical tests of statistical significance. Analysis of variance. Regression and correlation. Experimental designs and clinical trials.

**200 LEVEL – SECOND SEMESTER**

**ANT 222: Gross Anatomy of Thorax, Abdomen, Pelvis and Perineum (3 Credit Units)**

**Anatomy of Thorax:**

The thoracic cage; apertures and its frame work: Anatomy of the lungs and pleurae, respiratory movements; superficial structure, Thoracic duct, Sternal joints, Sternocostal joints, Interchondral joints Costochondral joints, Costovertebral joints, Joints and Ligaments of the Vertebral column, intercoastal arteries and veins, internal thoracic artery, mediastina and diaphragm, Lateral parts and pleurals, Roots of the lungs, Lobes of the lungs, Intrapulmonary structure, heart and

large vessels; Sternocoastal surface of the heart, Surface anatomy of the heart Chambers of the heart, Structure of walls of heart trachea, bronchi; lymphatic drainage of thorax; correlation of course with clinical medicine; regional anatomy, surface anatomy and radiological anatomy. The student will dissect the thorax.

### **Anatomy of Abdomen:**

The Abdominal walls including planes; hernia, peritoneal cavity. Diaphragm, Abdominal viscera – stomach, intestines, liver, pancreas, spleen, pancreas, kidneys and suprarenal. The blood vessels and nerves in the abdomen, Lymphatic GIT. Applied anatomy, surface and radiological anatomy. The student will dissect the abdomen.

### **Anatomy of Pelvis and Perineum:**

The bony pelvis, joints of the pelvis, determination of sex of pelvic bones. The pelvic organs – male and female. Pelvic walls and floor, pelvic peritoneum, viscera, nerves and vessels. The perineum – male and female; external genitalia – correlation with reproduction, child birth and other clinical aspects. Superficial/Deep perineal pouches, The student will dissect the pelvis and perineum.

### **ANT 224: Histology II (Systemic Histology) (2 Credit Units)**

Blood Vascular system, Fine structure of capillary wall, Arteries, veins, The heart, Histogenesis of blood vessels and heart, Impulse conducting system, Lymphatic system Vessels, Organs — lymph nodes, function, histogenesis and regeneration, The spleen — Histological organization functions, histogenesis and regeneration, The thymus- Histological organization functions, involution of thymus, Mammary Gland, Resting and Active Functions-endocrine control, regression and involution of mammary gland, Histogenesis, Skin, Endocrine system, Reproductive system (Male and Female ) and Urinary system GIT.

### **ANT: Anatomy Practical (I & II)**

### **HPH 222: Practical Physiology (1 Credit Unit)**

A basic practical demonstration of some important areas covered in human physiology I-IV. Blood Grouping, Packed Cell Volume, WBC, RBC, Differential Count, Pulse Rate and Blood Pressure, e.t.c.

### **HPH 224: GIT and Renal Physiology (2 Credit Units)**

Renal physiology, Introduction, General functions of the kidney, Structure of kidney, nephron structure. Differences in Nephron structure. Mechanism of urine formation, GFR, tubular transport, absorption and tubular secretion, Blood flow to kidney auto regulation of blood flow, blood vessels, arteries, arterioles, vein, venules, capillaries, Interstitial fluids (IF) and vessels through which they flow, Lymph and lymph vessels, Cerebrospinal fluid and its vessels. Cortical and Juxtaglomerular apparatus, and determination of renal blood flow. Clearance, insulin and Para amino hippacric acid clearance, glomerular filtration rate, factors affecting it, Proximal convoluted tubules, loop of henle, and distal convoluted tubule, Differences between cortical and medullary nephron, vasa recta, and tubular transport in glucose maximal. Role of urea and other electrolytes concentrate urine, concentration of urine and renal regulation of body water (osmolarity) and chabedesinspidus. Renal regulation of blood (ECF) volume, micturation reflexes innervation of urinary bladder, Role of kidney in acid base balance, Basis of dialysis, Diuretics, excretion of hormones Gluconeogenesis. Counter-current system. Water volume and ionic regulation. Micturition. Abnormalities of renal function. The skin function, temperature regulation, abnormalities of temperature regulation mechanism; factors regulating metabolism. Conditions for measuring basal metabolic rate. Compartmentalization and composition of body fluids. Determinants of Glomerular Filtration Rate: Glomerular capillary filtration coefficient (Kf) Bowman's capsule Hydrostatic pressure, Glomerular capillary, colloid Osmotic pressure Organic solutes that are reabsorbed: Glucose, amino acids, organic acids, peptides and proteins, urea. Organic solutes that are reabsorbed and secreted: Urea. Inorganic ions that are reabsorbed:  $Mg^{2+}$ ,  $Ca^{2+}$ ,  $PO_4^{2-}$ ,  $HCO_3^-$  Inorganic ions that are secreted: Renal handling of  $H^+$  ions. Inorganic ions that are reabsorbed and secreted:  $K^+$ ,  $Na^+$  Renal handling of  $Na^+$  and water Renal handling of Fe, vitamins, carbohydrates, proteins and lipids Renal Failure- proteinuria. Loss of concentrating and diluting ability, Acidosis, Abnormal  $Na^+$  metabolism, Control of Glomerular Filtration: Activation of the sympatheticus. Hormonal and Autacoids control of Renal Circulation – Angiotensin II. Endothelial – Derived Nitric Oxide – prostaglandins and Bradykinin; Auto regulation of GFR. Mechanism of urine concentration counter – current mechanism; current multiplier system. Quantity, composition and properties of urine.

**GIT Introduction to GIT:** Functions of GIT. Methods of studying the functions and structure of the G.I.T: Layers, Neural and Humoral control, Autonomic innervations of the G.I.T. Sympathetic and Parasympathetic Gastro-intestinal reflexes Functional types of movements in

the G.I.T; Propulsive and mixing. Hormonal control of G.I.T. Motility. Oral Cavity: Mastication. Salivary glands, functions of Saliva, Salivary reflexes, Inhibition of salivary secretion. Physio-anatomical consideration of the stomach; Functions of the stomach, mixing and propulsion of food in the stomach, regulation of gastric motility. Gastric Secretion; Composition, properties and functions of gastric juice. Effects of Nutrient patterns on gastric secretion. Regulation of gastric secretion Stomach (gastric) emptying.

Vomiting; Composition, properties and functions of pancreatic juice, effects of Nutrient composition on pancreatic secretion, functions of the liver, Composition, properties and functions of bile ejection, regulation of production and secretion of bile by the liver, mechanism of gall bladder emptying, gall stones. Intestinal glands-villi and microvilli, types of intestinal digestion Uniqueness of intestinal secretion of enzymes, small intestine motility control — neural, hormonal and small intestine reflexes, intestinal reflexes and intestinal inhibitory reflexes, gastro-intestinal reflex. Large intestine and Rectum, Colonic mortality, defecation, control of colonic and rectal motility myogenic and neural control Physiology of absorption, mechanism of absorption, absorption in the mouth, Stomach, small and large intestines (Note: absorption of CHO, proteins, fats, water, sodium e.t.c.) Location and functions of the Alimentary canal, Sensations of satiation, hunger and thirst; appetite physiology of Gastrointestinal disorders, Appendicitis, Diarrhoea, constipation cancerous tumours eating disorders peptic ulcer Jaundice. Effects and factors, which modify it Nervous influences, Humoral factors, Biological rhythms, Sex, Age & posture Indices of Cardiac Activity: Stroke (Systolic volume Cardiac Output, Heart work, venous return. Functions of the liver, Composition, properties and functions of bite bile ejection. Regulation of production and secretion of bile by the liver. Mechanism of gall bladder emptying. Gall stones. Intestinal glands-villi and microvilli. Types of intestinal digestion Uniqueness of intestinal secretion of enzymes small intestine motility control of small intestine motility – Genic, neural, hormonal small intestine reflexes. Intestino-intestinal and anointestinal inhibitory reflexes; gastro-intestinal reflex. Large intestine and Rectum, Colonic mortality, defecation, control of colonic and rectal motility myogenic and neural control Physiology of absorption, mechanism of absorption, absorption in the mouth, Stomach, small and large intestines (Note: absorption of CHO, proteins, fats, water, sodium e.t.c.) Location and functions of the Alimentary canal, Sensations of satiation, hunger and thirst; appetite physiology

of Gastrointestinal disorders, Appendicitis, diarrhoea, constipation cancerous tumours eating disorders peptic ulcer Jaundice.

Physiology of peptic ulcer, gastrin and vomiting. C.C.K., other G.I. Hormones, Functions of duodenum, jejunum and ileum secretions, Digestion and mechanism of absorption of fat, absorption, motility and functions, proteins, carbohydrate, water and vitamins, large intestine secretions, absorption, motility and functions Defecation. Diarrhea, Liver and Biliary System Including histological structure of liver, liver functions and liver functions test, jaundice and causes, types of hepatitis. Biliary system, structure of gall bladder, function of gall bladder, Structure and functions of bile salts, bile pigments direct and indirect bilirubin Gall stone and exocrine functions pancreas, hormonal and nervous control of pancreatic secretion, diseases of biliary system and pancreas.

### **HPH 226: Neuro-Physiology and Special Senses (2 Credit Units)**

The central Nervous system- brain and the spinal cord. The Peripheral nervous system. Sensory system including receptors, types and pathway of sensation, pain sensation, analgesic system, disturbances of sensation thalamus, sensory cortical areas, sensory functions of cerebral cortex, reaction to sensation. Reflex arc, Properties of reflex arc, general reflexes, spinal reflexes, stretch reflex, Muscle tone. Motor system sensory cortical areas including motor cerebral cortex, basal ganglia, cerebellum, temperature control, hypothalamus, limbic system, reticular formation, higher functions of cerebral cortex, learning and memory abnormalities, Speech and its abnormalities, temperature control, Excitation, action potential, development of resting membrane potential, action potential in skeletal, cardiac and other smooth muscles, characteristics of action potential in nerve tissue. Nerve cell- morphology of a nerve cell, types of nerve fibres, propagation of action potential in different types of nerves, salutatory and neighborhood conduction. Synapse- morphology of synapses, types of synapses, synaptic transmission of impulses, properties of synaptic transmission, synaptic junction. Applied physiology. Neuromuscular junction- morphology of a neuromuscular junction, neuromuscular transmission, transmission of impulse at neuromuscular junction. Applied physiology- myasthenia gravis. Muscles- Morphology of skeletal, cardiac and other smooth muscles. Molecular basis of muscle contraction- structure and function of the contractile protein, structure and function of regulatory proteins. Mechanism of contraction, excitation and coupling in muscle



contraction. Applied physiology of muscle contraction. Autonomic Nervous System (ANS) - general description of the ANS, basic physiology of the ANS and homeostasis Posture reflex function of spinal cord, sleep and EEG mechanism and abnormalities.

Special senses; including eye structure cornea, lens, vitreous humor, lens body and aqueous humor structure and functions of retina, visual pathway, accommodation reflex and pupillary light reflex, colour vision, theories, visual activity, visual field, area 17, 18, 19 and 8, Mechanism of retina stimulation, Abnormalities and lesions of visual pathway, Hearing including introduction. Physical properties of sound including structure of external ear, Middle ear and internal cochlea, Structure of cochlea, basement membrane, organ of Corti, mechanism of hearing, hearing pathway, abnormalities of hearing, hearing test, physical properties of sounds, area 41, 22. Sensation linear and rotational, utricle, saccule pathway, equilibrium, smell sensation including structure of smell receptors mechanism of stimulation, olfactory nerve, olfactory bulb and limbic system. Taste sensation on the tongue, types of taste, mapping of different taste sensation and 2/3 pathways, to cortex and Abnormalities.

### **BCH 252: Biochemical Methods (2 Credit Units)**

Principles of instrumentation. Concentration of macromolecules. Principles, methodologies and application of electrophoresis. Chromatography: partition and absorption chromatography. Centrifugation and isotopic techniques. Spectroscopy. Radioimmuno-assay, X-ray fluorescence, atomic absorption spectrophotometry, neutron activation analysis. Gas chromatography, Mass spectroscopy.

### **BCH 254: General Metabolism (2 Credit Units)**

(Carbohydrate metabolism, Lipids metabolism, Amino acids Metabolism, Nucleic acid metabolism)

Degradation and digestion of carbohydrates; Storage polysaccharides and cell walls. Glycogenesis, glycogenolysis glycolysis, tricarboxylic acid cycle, Phosphogluconate pathway, Cori cycle, Calvin cycle and gluconeogenesis, glyoxylate cycle. Disorders of carbohydrate metabolism; Oxidation of fatty acids. Formation and oxidation of ketone bodies, biosynthesis of

fatty acids, triacylglycerols, phospholipids, glycolipids, cholesterol, Acetyl CoA as a central precursor for biosynthesis of lipids. Genetic disorders of lipid metabolism.

Metabolism of amino acids and their derivatives; urea cycle; metabolism of inorganic nitrogen and sulphur cycle. Genetic Disorders of amino acid metabolism. Metabolism of purines and pyrimidines, Nucleosides and Nucleotides. Disorders of Nucleic acid metabolism. Genetic code, gene structure. Replication, Transcription and Translation. Genetic diseases and gene therapy.

### **BCH 256: Enzymology (2 Credit Units)**

#### **(Theory, kinetics and applications of enzymes)**

Definition, properties; classification and nomenclature of enzyme, vitamins as co-enzymes. Cofactors, activators and inhibitors. Factors affecting enzyme catalyzed reactions. Enzyme assay – colorimetric, coupled, spectrophotometric. Kinetics of one-substrate enzymes catalyzed reactions (Michaelis-Menten equation). Allosteric/regulatory enzymes. Applications of enzymes.

### **BCH 258: General Biochemistry Practical (1 Credit Units)**

#### **(General Biochemistry practical I & II)**

Introduction to the laboratory and laboratory equipment. Safety, housekeeping, washing and drying of glassware in the laboratory. Accuracy of measurement and transfer of liquids and solids. Qualitative and quantitative tests for amino acids and proteins. Introduction to photometry and colorimetry; standard curve and absorption spectra; Biuret method and the estimation of proteins. pH and buffer systems.

Qualitative test for carbohydrates; thin layer chromatographic separation of sugars. Estimation of glucose in biological fluids (blood and urine). Analysis of lipids for double bonds and free fatty acids; separation by thin layer chromatography.

### **MMB 202: Medical Microbiology and Parasitology (3 Credit Units)**

Historical aspects; Scope of microbiology; General characteristics of micro-organisms, growth and reproduction, sterilization and disinfection; Brief survey of microbes as friends and foes.

### **GST 204: Peace, Studies & Conflict Resolution (2 Credit Units)**

Peace Concepts in Peace Studies and Conflict Resolution, Peace as a Vehicle for Unity and Development, Conflict Issues, Types of Conflict, eg Ethnic/Religious/Political Conflicts, Root Causes of Conflict and Violence in Africa, Indigene/Settler Phenomenon, Peace- building; Management of Conflict and Security, Elements of Peace Studies and Conflict Resolution, Developing a Culture of Peace ; Peace Medium and Peace keeping, Alternative Dispute Resolution (ADR), Dialogue/Arbitration in Conflict Resolution, Role of International Organisations in Conflict Resolution, ECOWAS, African Union, United Nation, etc.

**GST 202: Logic, Philosophy and Human Existence (2 Credit Units)**

Brief survey of Main Branches of Philosophy, Symbolic Logic, Special Symbols in Symbolic Logic- conjunction, Negation, Affirmation, Disjunction, Equivalent Conditional Statement Laws of Thought, The Method of Deduction using Rules of Inference and Bi- Conditional Qualification Theory, Types of Discourse; Nature of Arguments, Validity and Soundness, Techniques for Evaluating Arguments, Distinction between Inductive and Deductive Inference, etc, (Illustrations will be taken from familiar texts, including literary materials, Law Reports, Newspaper publication, etc)

**300 LEVEL COURSES**

**FIRST SEMESTER**

**PAT 301: General Pathology (3 Credits Units)**

Introduction — Ancient, traditional and modern concept of diseases and their causes. The normal cell and cellular basis of disease. Tissues and cellular injury. Reaction to cellular injury — Inflammation. Necrosis, Healing and repair. Disturbances of cell growth — cellular adaptation and neoplasm. Cytogenetics and genetic disorders. Pigmentary disturbances. Calcification and Amyloidosis. Disorders of nutrition.

**PCL 313: Basic and Autonomic Pharmacology (2 Credits Units)**

Scope of pharmacology, Origin and sources of drugs, routes of administration of drugs, drug receptors and receptor isolation. Pharmacokinetics, absorption of drugs, excretion, biotransformation, Structure — activity relationship, Mode of action of drugs. Types of drug action; Drug action in man, compliance, individual variations, presence of other drugs, genetic effects, tolerance and tachyphaxis, effects of diseases, drugtoxicity, adverse drug reactions. Drug dependence and drug interactions.

**MMB 301: General Microbiology (3 Credits Units)**

The Kingdom Protozoa-organizational differences in eukaryotic cells, classification and nomenclature of micro-organisms. Bacterial cell form, structure, nutrition, reproduction and metabolism, Bacterial genetics. A typical procaryotic cell, viruses. Eucaryotic micro-organisms — fungi. Microbial control; microbes in food, water and environment. Bacterial infection and virulence. Phagocytosis. Introduction to pathogenic microbiology. Laboratory Animals. Types of breeding and uses

**MLS 301: Introduction to Medical Laboratory Science (2 Credit Units)**

Microscopy and Microtomy- Uses and care of Microscopes. Refrigerators and freeze-dryers-principles, Uses, care and maintenance. Handling of Laboratory organization and management, Simple analytical techniques in Chemical Pathology. Presentation of volumetric analysis, urinalysis etc. Principles of tissue preservation: fixation, processing and staining. Handling of surgical and autopsy specimens. Removal of formalin pigments. Basic tools of the Microbiologist — wire loop, cotton wool, pipettes, swabs and their uses. Preparation of films and basic staining techniques — Gram's stain, Ziehl Nelson's stain. Haematological stains — Principles and components. Blood film preparation and staining, pipettes, chambers, care and uses; Hb and PCV estimation, WBC counting.

**MLS 303: Medical Physics (2 Credit Units)**

Kinematical and Mathematical problems — circulation and pulse, blood pressure and volume changes, Temperature and heat flow, Electricity, electrocardiograms, general radiation, Linear energy transfer and radiation measurement, radiation damage-detection and safety, X-ray generation and application, radioisotopes production, use and disposal.

### **MLS 305: Laboratory Posting (3 Credit Units)**

Posting to all areas of Laboratory services to gain practical experience and acquire proper work ethics. Students will be posted to serve a five-week period in each of the following Departments: Chemical Pathology, Haematology, Medical Microbiology and Histopathology. Periodical examination will be conducted to test students understanding of procedures. A five hour practical examination will be conducted at the end of the semester to test the students' dexterity in the handling of equipment and performance of Laboratory tests.

### **ANT 311: Gross Anatomy of Head and Neck (2 Units)**

The anatomy of the head: The scalp, Osteology of the skull and cervical vertebrae. Cranium: Cranial and orbital cavities and sinuses; gross anatomy of the eye, mouth, tongue, pharynx, nasal cavity, larynx, anatomy of auditory, vestibular and visual apparatus; anatomy of exocrine and endocrine glands of head and Neck, Superficial and deep structures, fasciae; muscles, vessels, distribution of nerves and lymphatics of head and neck. **The practical period shall involve continuation of demonstration of gross anatomy and bones.**

#### **Neuroanatomy;**

Definition and origin of nervous system. The anatomy of the spinal cord, medulla oblongata, cerebellum, Pons, Mid-brain and Cerebrum; Neurons and other cells; fibre tracts and their functional correlations; cranial and spinal nerves, neurocranium, Meninges; vascular supply; C.S.F; autonomic nervous system. Introduction to various types of lesions and methods of examination of the C.N.S; Clinical correlations. The student will dissect the spinal cord and brain and study their microscopic anatomy. **The practical period shall involve continuation of demonstration of gross anatomy, Brain soft tissues.**

### **ENT 301: Introduction to Entrepreneurship Skills (2 Credit Units)**

Developing Entrepreneurship, the Nigerian Entrepreneurship Environment, Creativity and Intellectual Rights, Technological Entrepreneurship, Management of Innovation, Family

Business and Succession Planning, Women Entrepreneurship, Social Entrepreneurship, Business Opportunity Evaluation.

### **300 LEVEL – SECOND SEMESTER**

#### **MLS 302: Immunology I (3 Credits Units)**

Molecular basis of Immune reactions — antigens and the Immune response, Fate of antigens, Immunoglobulins — structure and function, general organization and assembly, classification, Antigenantibody interactions. Phagocytic cells, chemotaxis and effector function of macrophages and granulocytes. The complement system and complement abnormalities, innate Immunity — factors affecting e.g age, species specific, anatomical factors (skin membranes), nutrition, hormones, acquired Immunity — active and passive — factors affecting acquired Immunity. Lymphoproliferative organs and their functions in Immune responses. Diagnostic serological tests for assessing humoral Immunity. Tissue and organ transplantation — HLA system. Transplantation and pregnancy.

#### **MLS 304: Medical Laboratory Science Ethics (2 Credits Units)**

History and Philosophy of ethics in the practice of Medical Laboratory Science. Relationship between religion and sociocultural values of Medical ethics. Ethical issues involved in private practice. Relationship between the Medical Laboratory Scientist and his patient/blood donor. Relationship between the Medical Laboratory Scientist and other members of the health team, Intraprofessional auditing, Medical Laboratory Science consultancy services, Elements of informed consent in research, Relationship between proper dressing, personal comportment? and patient care; the Psychologist's view. Medical Laboratory Science ethics, as it affects paternity disputes, infertility studies, sexually transmitted diseases etc. Real case presentations. Medico-legal aspects of Medical -Laboratory practice.

#### **MLS 306: Laboratory Posting (3 Credit Units)**

Posting to all areas of Laboratory services to gain practical experience and acquire proper work ethics. Students will be posted to serve a five-week period in each of the following Departments: Chemical Pathology, Haematology, Medical Microbiology and Histopathology. Periodical examination will be conducted to test students understanding of procedures. A five hour practical

examination will be conducted at the end of the semester to test the students' dexterity in the handling of equipment and performance of Laboratory tests.

**MLS 308: Biomedical Engineering (3 Credit Units)**

Principles of applied and general electronics and the mechanics of electrical circuits. Fault finding, care and maintenance of common electrical equipment in Laboratory use. Workshop practice, principles of use, maintenance and repair of common apparatus and Laboratory equipment. DC currents and resistors, capacitors, potentiometers, and resistance boxes, galvanometers and AVO meters. Solenoid, rheostat and transformers, thermostats, semiconductors and rectifiers-filters, photomultipliers, tubes and scintillators. Improvisation Glass blowing and construction of simple laboratory equipment. Design techniques, improvement on existing equipment, review and modification of laboratory methods.

**MLS 310: Medical Laboratory Management and Supply Chain (3 Credit units)**

Supply chain management (SCM), SOP manual for SCM, Logistics Management Information System (LMIS), Introduction to Max/Min Inventory Control System (ICS), Supply pipeline and stock status assessment, Storage of Medical Laboratory Commodities, Assessing health logistics systems, Product selection and quantification, Supply planning and shipment scheduling, Procurement of Medical Laboratory Commodities, Monitoring and supervision of logistics system, Personnel, planning and organization, Laboratory management account and budgeting. Ordering, stocking — card indexing and storage, Occupational hazards and Laboratory, safety precautions and First-aid in Laboratory accidents.

Principle and function of management, personnel management , staff/management relationship, management and administration practices, laboratory planning, theory and practice of Quality control, various methods of quality controls; factors affecting quality of out-put. Research.

**MLS 312: Instrumentation in Medical Laboratory Sciences (3 Credit Units)**

Micrometry, Designs and thermostatic controls of incubators, water baths and ovens. Principles, care and use of the autoclave, centrifuge, anaerobic incubators and jars, vacuum pumps, PH Meters, membrane filtration equipment, chromatographic instruments, photometer, spectrophotometers and colorimeters — design and calibration, Principles of fluorescence,

luminescence and application. Nephelometry. Principles and applications of atomic absorption, spectroscopy and atomic fluorescence. Continuous flow analysis and discrete analysers. Scintillation and ionization counters — design, use and standardization, Photomicrographic and autoradiographic equipment, Principles and uses of electrophoresis pack, Coulter counter and staining machines. Principles and uses of Microtomes including cryostat and ultramicrotomes. Microtome knives, strops and hones. Automatic knives sharpeners. Automatic tissue processing machines and timing discs. Paraffin section mounting baths (water baths). Vacuum embedding chambers. Fluorescent, phase contrast and electron microscopes.

Separation techniques including electrophoresis, paper cellulose acetate agar gel, starch and polyacrylamide gel, iso-electric focusing, molecular sieves; Dialysis filtration, solvent extraction.

#### **PCL 314: Chemotherapy and Systemic Pharmacology (3 Credit Units)**

Drugs mechanism of action as they relate to specific diseases and organs, particularly pertaining to the following modules, namely: neuroscience, immunology, microbiology and oncology with practical component. Antimicrobial Pharmacology chemotherapeutic agents, anti- 357 metabolic base analogues, mitotic inhibitors, antibiotics, enzymes, alkylating agents and hormones. Radiation therapy, immune therapy and cancer therapy, synthesis and physiology of neurotransmitters Biochemical basis of depression. Narcotics-Mechanism of action. Fluorescent, radio and chromatographic methods in drug studies. Methods of evaluation of toxins mutagens and carcinogens.

### **400 LEVEL - FIRST SEMESTER COURSES**

#### **HEM 401: Basic Haematology (3 Credit Units)**

Origin, development, structure and function of blood cells. Synthesis and breakdown of haemoglobins; visual and electronic cell counting procedures. Absolute values. Iron, Vitamin B12 and folate metabolism. Nutritional anaemias and their investigations. Introduction to



haemostasis, Principles and mode of action of common anticoagulants, simple tests used in blood coagulation investigations. Haemochromatosis and related storage disorders.

Nomenclature, classifications and investigations of common haemoglobinopathies. Myeloproliferative disorders, Lymphoproliferative disorders, Bone marrow.

### **HEM 403: Basic Immunohaematology/ Blood Group Serology (3 Credit units)**

ABO and Rhesus blood groups — inheritance, biosynthesis, distribution and genetic theory. Other blood groups; MNS, Kell, Duffy, Lewis, Kidd, PI etc. Blood grouping techniques principles, advantages, and disadvantages. Antisera, Lectins and enzymes including preparation and standardization. Anticoagulants used in BGS — AD, CPD, CPD-A, etc. Modes of action and side effects. MRC blood bottles and plastic bags- advantages and disadvantages. Blood donor screening; HIV, HBV, HCV, VDRL, CMV, malaria, trypanosome etc. preparation and storage of blood products — cryoprecipitate, platelet rich plasma, packed cells, fresh frozen plasma, fibrinogen, WBC etc. Blood compatibility testing. Choice of blood for transfusion. Investigation of transfusion reactions. Haemolysin titration. Absorption and elution techniques. Blood group specific substances — neutralization reactions. Blood banking - organization, structures, facilities and records. Quality assurance — physical, chemical and reagent. AHG — DCT and ICT procedures. Haemolytic disease of newborn, antenatal and post natal management, blood group in paternity dispute. Antibody Screening, clinical significance, secretor status and antenatal serology

### **MMB 401: Basic Bacteriology/Medical Mycology (3 Credit Units)**

Methods for the demonstration of bacterial forms and structure. Design and preparation of culture media. Sterilization and other methods of bacterial control. Aseptic procedures and methods for pure culture isolation. Procedures for receiving, handling and processing of clinical specimens. Antibiotic assay sensitivity tests and chemotherapy. Plate reading. Principles and techniques of anaerobic bacteria, Methods of total and viable counts. Stock culture preservation. Quality control of culture and media. Record keeping in Bacteriology laboratory. Staining techniques for spores, capsules and negative staining procedure. Wet preparation, motility tests. Introductory Mycology.

Epidemiology of communicable diseases, disease spectrum and control, Aspect of public health and environmental microbiology, Diagnostic microbiology. Vaccine production and immunization.

#### **MMB 405: Basic Medical Parasitology and Entomology (3 Credit Units)**

Classification and life cycle of protozoans — the amoebas, ciliates, flagellates and sporozoans. Life cycle and pathogenicity of the nematodes — *Ascar Strongyloides*, *Trichuris*, guinea worm, Hookworms, *Trichinella*, *Enterobius vermicularis* etc. Life cycle and pathogenicity of cestodes — the tapeworms *Diphyllobothrium latum*, *Echinococcus* — hydatid disease, larval forms of cestodes, life cycle and pathogenicity of the Trematodes — *Schistosomes*, *Fasciola* and *Paragonimus*. Methods of demonstration of parasites in blood, faeces, vagina, urine, urethra, pus from lungs and liver, skin snips etc. Mechanisms of their disease production. Epidemiology and control of parasitic diseases. Arthropods of Medical importance — the Crustaceans, Arachnida, Hexapoda, Myiasis etc. their biology, life cycles and control. Biology of mosquito in relation to transmission of malaria, filarial and viral infection.

#### **MMB 407: Basic Virology I (2 Credit Units)**

Morphology and life cycle of viruses, nomenclature and classification — various methods. Reproduction, resistance, pathology, collection of clinical specimens for viral culture. Culture methods for isolation of viruses. Purification, Immunity and laboratory diagnosis of viral infections — Haemagglutination test, CFT, Neutralisation of tests. Systematic study of viral diseases. Interferon, Immunotherapy and haemotherapy in viral infections, inclusion bodies and cytopathetic effects. Viral/host interactions and identifications. Viral vaccines and Immunoprophylaxis.

#### **PTH 401: Basic Histopathology (3 Credit Units)**

Fixation, Autolysis, bacterial decomposition, effects of fixation, common fixing agents and their uses — Secondary fixation pigments. Decalcification — aims and application, decalcifying agents, tests for checking completion of decalcification. Dehydration, clearing and infiltration/embedding. Frozen and celloidin sections, embedding media. Basic histology of organs. Tissue sectioning procedures and slide preparation. Staining procedures. Storage of blocks, museum techniques — colour restoration, mounting in museum jars, gross appearance of diseased body in routine post mortem. Slide examination to illustrate normal and abnormal features common tumours etc.

**CHP 401: Basic Chemical Pathology (3 Credit Units)**

Normal contents of body compartments and their measurements — sodium, potassium, calcium, magnesium, chloride and bicarbonate. Estimation of blood and urine glucose, plasma proteins. Water depletion, water excess, sodium excess, recognition of combined sodium and water depletion. Treatment water and electrolyte imbalance in infants. Potassium — normal value hyperkalaemia. Magnesium, cation exchange-resin therapy, maintenance normal blood pH, Metabolic disturbances of acid-base balance, metabolic acidosis, Respiratory acidosis, metabolic and respiratory alkalosis, Investigation of disturbances of acid-base equilibrium, Blood chemistry bone disease. Disorders of bone formation — osteoporosis, osteomalacia, hyperparathyroidism, Biochemical analysis of faeces.

**\*MLS 402 Laboratory Posting****400 LEVEL - SECOND SEMESTER****MMB 402: Microbial Genetics (2 Credit Units)**

Evolution and inheritance of mutation. Bacterial DNA in heredity and mutation. Molecular basis of mutation. Isolation of mutants. Bacteriophages – plasmid episomes, transposomes and bacterial CAN transfers. Recombinant DNA technology and its applications.

**PTH 402: Forensic Science I (3 Credit Units)**

Similarities and differences between forensic science and forensic pathology. Previews of analytical techniques in chemistry and biology that are so critical in forensic science. Principles and use of sophisticated analytical instruments including Fourier transform infrared spectroscopy, liquid chromatography, nuclear magnetic resonance spectroscopy, gas chromatography, mass spectrometry and induction coupled plasma mass spectrometry. Biological profiling, introductory toxicology, physical examination of evidence, specific aspects of forensic science such as legal issues in F/S and forensic case study.

**MLS 404: Molecular Biology I (3 Credit Units)**

Evolution of the cell; small molecules, energy and biosynthesis; macromolecules; structure, shape and information; how cells are studied, protein function; basic genetic mechanisms; RNA and protein synthesis, DNA repair, DNA replication, genetic recombination; viruses, plasmids and transposable genetic elements; growth and cell division cycle. Mutation and evolution; Evolutionary relationships among living organisms.

#### **MLS 406: Immunology II (2 Credit Units)**

Cell mediated Immunological reactions. Hypersensitivity reactions, Immunological tolerance. AutoImmunity and auto-Immune diseases. Immunosuppression and Immunodeficiency diseases. Immunity and infections Tumour Immunology, Immune reactions in tissue damage. Immune complex diseases. Diagnostic tests for assessing cellular Immune functions Principles fractionation procedures, vaccination and Immunization.

#### **MLS 408: Point of Care Testing (2 Credit Units)**

Evolution of near patient testing; Principles and performance of Point of Care Testing (POCT) devices; role of POCT in medical practice; Limitations of POCT, Generic POCT solutions (including specifications, principles, and operations) and limitations in haematology, haemostasis, infectious diseases, toxicology, clinical chemistry and molecular diagnostics; Information connectivity and integration of POCT with laboratory interface; quality management and regulatory oversight of POCT solution by the medical laboratory; Regulatory guidelines for new POCT devices/services.

#### **CHP 402 Chemical Pathology (2 Credit Units)**

Porphyria, causes, symptoms and laboratory investigation of porphyriaemia, porphyria and Porphyrinuria, Haemoglobin, synthesis, function. Glycosylated haemoglobins. Liver function Tests. Mechanism of Enzyme action and kinetics: Clinical Enzymology; Isoenzymes in medicine, Coenzymes and Vitamins. Definition, causes, consequences and investigation of some inborn errors of metabolism; Phenylketonuria, galactosaemia fructose intolerance, Albinism, aminoacidurias, Endocrine glands and functions; the hypothalamus, the pituitary, the parathyroid, adrenal cortex, adrenal medulla, the gonads and reproductive endocrinology. Foeto-placental function. Calcium and bone metabolism. Pancreatic function tests. Basic neurochemistry, CSF – normal composition and changes in disease.

## **ENT 402 – Business Creation and Growth (2 Credit Units)**

Concept of business and new value creation financing, Theories of growth, Sources of funds, Marketing, New opportunities for expansion, Ethics and social responsibility, managing transition from start up to growth.

## **500 LEVEL COURSES**

### **CHEMICAL PATHOLOGY**

#### **FIRST SEMESTER**

#### **CHP 501: Chemical Pathology I (3 Credit Units)**

Principles of analytical techniques in clinical chemistry, devising of new techniques, biological trails and tests for acceptability; Solid/Dry phase chemistry, dipstick technology, thin film technology & Immobilized enzymes, analytical techniques for qualitative and quantitative determination of enzymes, hormones, proteins, lipids, trace elements, non-protein nitrogen. Volumetric analysis - Partition, absorption of gel filtration, ion exchange and gas liquid chromatography. Electrochemical analysis – principles of potentiometric analysis. Fractionation of proteins – fractional precipitation (salting out); Chromatographic and electrophoretic procedures. Protein precipitants – mode of action and choice in analytical procedures

#### **CHP 503: Chemical Pathology II (3 Credit Units)**

Physiology of the pancreas and the alimentary canal. Pancreatic function tests- to include secretin and pancreozymin stimulation tests. Glucose tolerance test, insulin sensitivity test, estimation of amylase. Estimation of the activity of trypsin in duodenal contents, gastric function tests to include F-ICL secretions, histamine and augmented histamine tests. Fractional and tubeless test meals. Intestinal absorption test, vitamin absorption test, the Congo red test for amyloidosis and faecal fat estimations. Diseases of the muscle. Lipidaemia, hyperlipoproteinaemia and hypolipoproteinaemia — definition, causes consequences and investigation.

#### **CHP 505: Chemical Pathology III (3 Credit Units)**

Physiology of the Kidney, renal clearance and glomerular filtration rate. Renal plasma flow, maximal tubular excretory and reabsorptive cap, Urea clearance, creatinine and inuline clearance. Concentration and dilution tests. Impairment of renal function. Renal failures.

Azotaemia, ureamia, Anuria. Sodium loss in renal disease. The liver — anatomy and physiology — Biosynthesis of bilirubin, excretion of bile pigments. Jaundice — types and pigment excretion in jaundice; urine, blood urea and ammonia. Paraproteinaemia, Bence Jones proteinuria and significance. Porphyrinaemia, porphyria and porphyrinuria. Definition, causes, consequences and investigation of some inborn-errors of metabolism. Phenylketonuria, Galactosaemia, fructose intolerance, Albinism, Akaptonuria, aminoacidurias, Causes and investigations of nutritional disorder.

### **CHP 507: Clinical Enzymology (3 Credit Units)**

General principles of enzyme kinetics, activation and repression of enzyme activities. Enzymes as catalysts, protein and co-factors. Enzymes induction, inhibition, purification and specificity. Michaeli's constant. Diagnostic Enzymology, Isoenzymes and Coenzymes.

### **MLS 501: Research Methodology (3 Credit Units)**

Introduction to research methodology. Collection of literature review articles. Problem definition. Sampling techniques. Experimental designs of medical and public health studies. Questionnaire design and data collection analysis. The role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects. Art of scholarly publications.

### **MLS 503: Molecular Biology II Techniques and Applications (3 CREDITS)**

Bioinformatics: Genomic/cDNA library – preparation and isolation, cloning, primer design and RT-PCR and its application in diagnosis. Blotting (principle and application of Western, Southern and Northern blots). Purification of RNA and DNA. Transgenic animals and their uses in research. Tissue culture techniques. Use of recombinant DNA in the production of monoclonal antibodies. Genetic engineering and its application in Biotechnology.

**MLS 505: Laboratory Posting (3 Credit Units)**

This involves bench rotation in the Clinical Pathology. The students is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**SECOND SEMETER****CHP 502: Clinical Endocrinology (3 Credit Units)**

Physiology of the Thyroid glands, the basal metabolic rate, hyperthyroidism and Antithyroid drugs. The use of radioactive iodine, adrenocorticotrophic hormones and the adrenal glands, adrenal hormones, adrenocortical hyperactivity and hypoactivity. Assessment of function of gonadotrophic hormones and their relationship to ovarian disease, steroids of biochemical importance and their urinary excretion products. Estimation of urinary 17- Ketosteroids and 17-hydroxy- corticosteroids, noradrenalin, adrenalin and their metabolites.

**CHP 504: Clinical Toxicology (3 Credit Units)**

Practical and theoretical aspects of poisoning, investigations of suspected cases of poisoning, estimation of blood alcohol, detection of barbiturates, cocaine, heroin, opium etc. in urine, sweat, blood and duodenal aspirate. Estimation of blood salicylates, sulphonamides, blood O, CO and pH. Trace elements — bioavailability and 2 2 function.

**CHP 506: Advanced Chemical Pathology Techniques (3 Credit Units)**

Principles and Techniques of isoelectric focusing, high performance liquid chromatography (HPLC) and affinity chromatography, Isotope labeling techniques. Measurement of radioactivity, Preparation and analytical ultracentrifugation. Cell cloning, Preparation of monoclonal antibodies, Fluorescence antibody technique and radioImmunoassay. Electrophoresis —paper, cellulose acetate, agar gel, starch and polyacrilamide. Iso-electric focusing, SDS-PAGE electrophoresis, enzyme Immunoassays, receptor assays. Automation, Micro and ultramicro analysis.

**MLS 502: Seminar (2 Credit Units)**

The student will be required to conduct literature search on a topic in Chemical Pathology, write up a review, and present a seminar on it. Final grade on the course will be based on the literature review and seminar presentation.

**MLS 504: Laboratory Posting (3 Credit Units)**

This involves bench rotation in the Clinical Pathology. The students is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**MLS 506: Research Project (6 Credit Units)**

This is a supervised research project on an approved topic to be undertaken by each student in the final year for Partial fulfillment of the B. MLS degree requirements. Assessment of the project would be by grading of the project content a panel of internal assessors; including supervisors, to be chaired by the Head of Department.

**HAEMATOLOGY/ BLOOD TRANSFUSION SCIENCES OPTION**

**FIRST SEMESTER**

**HEM 501: Haematology I (3 Credit Units)**

Haemoglobinopathy I and II—to include red cell membrane haemoglobin, and enzymes abnormalities, Genetics of RBC metabolism. Acquired haemolytic anaemia and their investigation. Leucocytes — Physiology, kinetics, and functions, Leucocytosis and eucopaenia. Leukaemias — classifications including the FAB mode, features and laboratory management. Cytochemical procedures, Myeloproliferative and Lymphoproliferative disorders. Preparation and cytology of blood and bone marrow films in health and disease. Platelets; Structure, Physiology and functions, tests for platelet function. Normal and abnormal Haemostasis — coagulation factors, platelets, vascular integrity, inhibitors, fibrinolytic activity etc. Haemorrhagic disorders, Control of anticoagulant therapy and Haemophilia states.

**HEM 503: Haematology II (3 Credit Units)**

Identification of blood parasites, the spleen and splenomegaly syndromes. Drugs, Chemicals and the blood, blood in infancy, childhood and pregnancy. Heredity and blood disorders, blood in



microbial infections. Anaemia in community; classification, mechanism and laboratory investigations in Immunoheamatological disorders, Autoimmune haemolytic anaemia, thrombocytopaenia, leucopaenia, systemic and disseminated lupus erythematosus, rheumatoid arthritis, etc. Myelomatosis and other MPRa proteinaemia.

### **HEM 505: Blood Group Serology 1 (3 Credit Units)**

Genotype in Rhesus blood Groups, other blood groups- MNS, kell, kidd, Duffy, Lewis. P1, e.t.c. Haemolytic disease of the Newborn- Types, aetiology, antenatal and postnatal management. Blood group serology in paternity dispute. Haemolysin titration, absorption and Elution techniques. Indications and complications of blood transfusion. Red cell survival tests — Radioisotope and differential agglutination methods. Screening of donor blood for infective agents — HIV, HBV, Malaria, trypanosomes, Syphilis etc. Anamalous results in compatibility testing, preparation and standardization of AHG.

### **HEM 507: Blood Group Serology II (3 Credit Units)**

Leucocyte and platelet antigens and antibodies, National blood transfusion service, preparation of commercial quantities of polyclonal antisera, principles, uses and techniques of producing monoclonal antibodies, types of blood substitutes and preservations, WHO standards in BGS, quality assurance in BGS, and Red cell membrane structure in relation to blood group antigen locations.

### **MLS 503: Molecular Biology II Techniques and Applications (3 Credit Units)**

Bioinformatics: Genomic/cDNA library – preparation and isolation, cloning, primer design and RT-PCR and its application in diagnosis. Blotting (principle and application of Western, Southern and Northern blots). Purification of RNA and DNA. Transgenic animals and their uses in research. Tissue culture techniques. Use of recombinant DNA in the production of monoclonal antibodies. Genetic engineering and its application in Biotechnology.

### **MLS 501: Research Methodology (3 Credit Units)**

Introduction to research methodology. Collection of literature review articles. Problem definition. Sampling techniques. Experimental designs of medical and public health studies.

Questionnaire design and data collection analysis. The role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects. Art of scholarly publications.

## **SECOND SEMESTER**

### **MLS 502: Seminar (2 Credit Units)**

The student will be required to conduct literature search on a topic in Hematology, write up a review, and present a seminar on it. Final grade on the course will be based on the literature review and seminar presentation.

### **HEM 502: Cytogenetics (3 Credit Units)**

Sex chromosome, in-activation of x-chromosomes. Theory and practice of clinical cytogenetics, mosaicism, mapping of autosomes and X-chromosomes. DNA synthesis, genes in kindred segregation, dominant and recessive inheritance, X-linked inheritance, independent assortment, linkage and association, allelism, genes and the individual gene variation and interactions. Chimeras, genes in families and population selection, pedigree analysis, mutation and mutagens. Hardy-Weinberg equation; genetic drift and inbreeding, methods of cytogenetic analysis, including staining. Chromosomes abnormalities — Trisomy, monosomy, translocation, nondisjunction, deletion, duplication, isochromosomes, Klinefelter's and Turner's Syndromes. Philadelphia and Christ Church chromosomes. Clones and Slide reporting.

### **HEM 504: Advanced Haematological Techniques (3 Credit Units)**

Principles and techniques of isoelectric focusing, protein separation by column chromatography. Finger printing- principles and techniques, purification of proteins/enzymes, Ultracentrifugation and molecular weight determination. Culture of blood cells and parasites, Leucocyte typing. Platelet aggregation- principles and techniques. Isotope labeling techniques, measurement of radioactivity. Fluorescence antibody techniques, radio-Immunoassay, ELISA, Western blotting, Immunoelectrophoresis.

Electrophoresis, Competitive protein binding, Electrophoresis starch, agar gel and polyacrilamide gel. Principles of polymerase chain rection, Paul Bunnell test, Demonstration of Iron, Foetal Haemoglobin, Ham's test and Lymphocyte transformation test etc.

**HEM 506: Advanced Blood Group Serology Techniques (3 Credit Units)**

Techniques for emergency compatibility testing — Low ionic sucrose solution, spin coomb's albumin. Special compatibility techniques- Exchange and Extracoporeal blood transfusion. Preparation of enzymes used in BGS, forensic applications of BGS, 2 stages of coomb's technique. Automation in BGS, Groupamatic Technicon autoanalysers for antibody and antigen detection and identification, pipette washers e.t.c.

**MLS 504: Laboratory Posting II (3 Credit Units)**

This involves bench rotation in the Pathology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**MLS 506: Research Project (6 Credit Units)**

This is a supervised research project on an approved topic to be undertaken by each student in the final year for Partial fulfillment of the B. MLS degree requirements. Assessment of the project would be by grading of the project content a panel of internal assessors; including supervisors, to be chaired by the Head of Department.

**HISTOPATHOLOGY OPTION**

**FIRST SEMESTER**

**PTH 501: Histopathology I (3 Credit Units)**

Principles of histochemical methods, DNA demonstration by Feulgen techniques, silver impregnation methods, PAS, Manson trichrome - iron impregnation methods. Cyro-screening and slide reporting, tissue culture techniques, Genes and genetic codes. Chromattin tissues, Schmols, Diazo and Perl's reaction. Other histochemical procedures. Enzyme histochemistry — Acid and alkaline phosphatases, oxidative Enzymes, Quality assurance and automation in Histopathology laboratory.

**PTH 503: Histopathology II (3 Credit Units)**

Cytology of normal cells, review of histology of— cardiovascular, Respiratory, Gastro-intestinal, Urogenital, Neuro-histology, and histology of — endocrine glands, pituitary, Thyroid, Pancreas, Adrenal, Ovary and testis. Cytology of epithelial cells, atypical and malignant cells.

**PTH 505: Histopathology III (3 Credit Units)**

Systemic Pathology: Heart; Hypertensive heart-disease, heart failure, and Cardiomyopathies, Respiratory; Tuberculosis and Pneumonia, Renal; Nephropathy associated with infestations and infections, glomerulonephritis, Lymphoreticular; Malignant lymphomas (Non-Hodgkins and Hodgkins lymphoma, Burkitts). Idiopathic; Tropical Splenomegaly syndrome, Gastrointestinal tract; Cancers of the mouth, Oesophagus, intestines and stomach. Liver; Hepatitis, Cirrhosis, primary Liver cell carcinoma, Female Reproductive Organs; Pelvic inflammatory disease, Cancer; Cervical, trophoblastic, ovarian, Skin Leprosy and Kaposi sarcoma. Nutritional; Protein energy malnutrition and Slide reporting.

**PTH 507: Exfoliative Cytology (3 Credit Units)**

Introduction to exfoliative cytology, definitions and principles of exfoliative cytology methods. Diagnostic criteria for cell malignancy, kinds of tumours, sampling, fixation and staining techniques in clinical cytology. Gynae (Cytology), hormonal evaluations, cells and other constituents in sputum, effusions, CSF, urine and other fluids, slide reporting.

**MLS 505: Laboratory Posting I (3 Credit Units)**

This involves bench rotation in the Pathology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**MLS 501: Research Methodology (3 Credit Units)**

Introduction to research methodology, Collection of literature review articles. Problem definition, Sampling techniques, experimental designs of medical and Public health studies. Questionnaire design and data collection analysis, the role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects and art of scholarly publications.

### **MLS 503: Molecular Biology II Techniques and Applications (3 Credit Units)**

Bioinformatics: Genomic/cDNA library – preparation and isolation, cloning, primer design and RT-PCR and its application in diagnosis.

Blotting (principle and application of Western, Southern and Northern blots). Purification of RNA and DNA. Transgenic animals and their uses in research. Tissue culture techniques. Use of recombinant DNA in the production of monoclonal antibodies.

Genetic engineering and its application in Biotechnology.

### **SECOND SEMESTER**

#### **MLS 502: Seminar (2 Credit Units)**

The student will be required to conduct literature search on a topic in Histopathology, write up a review and present a seminar in it. Final grade on the course will be based on the literature review and seminar presentation.

#### **PTH 502: Cytogenetics (3 Credit Units)**

Theory and Practice of Clinical Cytogenetics, Chromosome analysis, structure, organization and staining techniques chromosomes in man. Normal Karyotype and Chromosomal abnormalities. Mosaicism, Trisomy, monosomy, translocation, Klinefelter's and Turner's Synoromes; Sex Chromatin. Inactivation of X and sex determination. Genetic diseases, clones, mapping of autosomes, DNA synthesis, Genes in Kindred segregation. X-linked inheritance. Chimeras. Genes in families and population, selection, Pedigree analysis, mutation and mutagens, Hardy — Weinberg equation, genetic drift, inbreeding. Slide reporting, Philadelphia and Christ Church Chromosomes.

#### **PTH 504: Advanced Histopathology Techniques (3 Credit Units)**

Fluorescence microtechniques, Autoradiography — Principles and techniques, Ultramicrotomy, Microincineration, Principles of photograph; macro and microphotography. Preparation of stained smears and specimen for microphotography and macrophotography respectively. Electron microscopy preparation of materials and embedding reagents used. Toxicity of some reagents used in electron microscopy. Embalmmnt techniques and demonstrations.

**PTH 506: Embalmmnt AND Museum Techniques (3 Credit Units)**

Preparation and Museum mounting of specimens, techniques of museum display, organisation of a medical Museum, Fixation and storage of museum specimens, Special museum techniques e.g Dawson's method, Methods of colour maintenance.

Embalmmnt techniques and demonstration; History, theory, ethics and practices of embalmmnt.

**MLS 504: Laboratory Posting II (3 Credit Units)**

This involves bench rotation in the Pathology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**MLS 506: Research Project (6 Credit Units)**

This is a supervised research project on an approved topic to be undertaken by each student in the final year for Partial fulfilment of the B. MLS degree requirements. Assessment of the project would be by grading of the project content a panel of internal assessors; including supervisors, to be chaired by the Head of Department

**MEDICAL MICROBIOLOGY OPTION**

**FIRST SEMESTER**

**MMB 501: Medical Bacteriology I (3 Credit Units)**

Principles of bacterial infection and pathogenesis, Biological and clinical basis of infectious diseases. Clinical and diagnostic microbiological consideration of diseases of upper respiratory. Lower respiratory, genitourinary and intestinal tracts, central nervous systemic organs. Definition, assessment, epidemiology and control of hospital-acquired infections.

Principles of bacterial taxonomy, Biochemical and serological basis of identification of Bacteria of medical importance. The pyogenic cocci (Staphylococcus, Streptococcus, Pneumococci, Neisseriae). The enterobacter — coliforms, Gastroenteritis and Food poisoning, Salmonellosis, Shigellosis, Vibrio cholera, Pseudomonas, Bacteriodes etc. the Haemophilis (Brucellae, Yersinia, Bordetalla etc). Anaerobic spore formers — Aerobic spore formers (Bacillus anthracis, Clostridia), the Spirochaetes, the mycobacteria, Actinomycetes, Corynobacteriae, Rickettsiae, Chlamydiae, Mycoplasma, L forms, Listeria, Erysipelothrix, Bartonella etc. general pathology, epidemiology features, diagnosis, control and therapy. Aseptic collection of clinical specimens. Supportive investigations — kin tests etc. to aid diagnosis. Rapid techniques in Medical Microbiology.

### **MPR 501: Medical Parasitology I (3 Credit Units)**

Knowledge of the structure, classification and life cycles of all protozoa and helminthes of medical importance and their intermediate hosts and vectors. Arthropods and other vectors of importance diseases of man. Parasites of animals such as Trypanosomes, Lewisi, Eimeriidae, Fasciola hepatica, Diphyliidium caninum, Larval forms of Taenia. Echinococcus granulosus. Hydatid disease in man. Morphology, physiology, life cycle and classification of protozoa, Rhizopoda (Amoebae), Mastigophora (Heamoflagellates and Intestinal Flagellates), Sporozoa (Malarial parasites, Coccidia), Ciliata (Balantidium) and parasites of certain classification; Toxoplasma, Sacrocystic, Pneumocystics.

### **MMB 503: Public Health Microbiology (3 Credit Units)**

General principles of microbial disease transmission — waterborne, airborne, food borne, arthropod-borne and contagious diseases.

Principles and techniques for water treatment. Waste water disposal, preventive measures in the control of Bacteria, Parasitic and viral infections. Vaccines and Immunization. Immunization programme and schedule (EPI).

### **MPR 503: Host Parasite Interactions and helminthic infections (3 credit Units)**

Interrelationships between bacterial and viral parasites and their host cells or tissues. Stresses microbial strategies and mechanisms of colonization, invasion, pathogenesis and resistance to host defense.

Morphology, Biology, Life cycle and classification. Cestodia-Order Pseudophyllidea and Order Cyclophyllidea. Trematoda –Superfamilies schistomatoides; Fascioloidea, Opisthorchoidea, Trichinelloidea, Strongyloidea, Filariodea.

**MPR 507: Advanced Parasitology/Epidemiology (3 Credit Units)**

Epidemiological study of protozoal and helminthic infections in rural communities. Advanced methods of differential diagnosis of Parasitic infections. Modern trends in parasitology, Basic concepts in the Immunology of Parasitic infections, definitions and principles of epidemiology. Epidemiology and control of common communicable and non-communicable diseases.

**MLS 503: Molecular Biology II Techniques and Applications (3 Credit Units)**

Bioinformatics: Genomic/cDNA library – preparation and isolation, cloning, primer design and RT-PCR and its application in diagnosis.

Blotting (principle and application of Western, Southern and Northern blots). Purification of RNA and DNA. Transgenic animals and their uses in research. Tissue culture techniques. Use of recombinant DNA in the production of monoclonal antibodies. Genetic engineering and its application in Biotechnology.

**MLS 505: Laboratory Posting (3 Credit Units)**

This involves bench rotation in Medical Microbiology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on Participation in the routine services of the laboratory.

**MLS 501: Research Methodology (3 Credit Units)**

Introduction to research methodology, collection of literature review articles. Problem definition, Sampling techniques. Experimental designs of medical and public health studies. Questionnaire design

and data collection analysis. The role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects and art of scholarly publications.

**SECOND SEMESTER**



**MMB 502: Pharmaceutical Microbiology and Advanced Techniques (3 Credit Units)**

Principles of antibiotic and chemotherapeutic modes of bacterial resistance to antibiotics, sensitivity testing. Preparation of antibiogram discs, minimum inhibitory concentration of antibiotics .

Antibiotics—history, mode of action, metabolism and classifications. Antibiotics assay, chemotherapy, use of animal models in the study of microbial infections. Automation in medical microbiology. Preparation and standardization of bacterial antigens and Immune sera. Immunofluorescence, radio-Immunoassay and ELISA techniques.

**MPR 502: Arthropods of Human Disease (2 Credit Units)**

Morphology, structure and classification of Arthropods of Medical importance. Dipera: Families– Culicidae, Psychodidae, Similidae, Ceratopogonidae, tatanidae, Muscidae, Calliporidae, Oestridgeae. Hemiptera: Families – pediculidae. Siphonaptera: Families publiodes, Coratophyllidae, Leprosyllidae. Acarina: Families –Ixodidae, Agrasidae, Trombiculidae, Dermanyssidae, Procrphyalides, Linguatulidae.

**MLS 502: Seminar (2 Credit Units)**

The student will be required to conduct literature search on a topic in Medical Microbiology, write up a review and present a seminar on it. Final grade on the course will be based on the literature review and seminar presentation.

**MLS 504: Laboratory Posting (3 Credit Units)**

This involves bench rotation in medical microbiology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on participation in the routine services of the laboratory.

**MMC 504: Advanced Medical Bacteriology and Special Topics (Techniques) ( 3Credit Units)**

Bacteriological diagnosis, prevention and control of infectious diseases in human, pathogenesis and epidemiological consideration of the diseases of urogenital and intestinal tracts, pathogenesis clinical significance and prevention of diseases of an aerobic pathogens, application of microbial activities for bioremediation of contaminated soil and ground water.

Concentration of parasites in faeces and body fluids. Hatching test for viability of ova. Detection of embryos and protozoa in vectors.

Methods of using a key for identification of arthropods. Preparation of thin and thick blood films for protozoa, diagnostic methods and procedures in helminthic infections, concentration methods for parasites in biological specimens, counting methods and culture technique. Permanent preparation of malaria sporozoites, oocysts, and exflagellating gametocytes. Preparation of reagents and procedures for fixing and staining faeces, tissues and arthropods containing parasites. Maintenance of blood protozoa and helminthes for teaching and research programmes. Snail aquaria. Permanent preparations of arthropods. An elementary knowledge of this preservation and mounting of pathological specimens. Preservation of arthropods, helminthes and protozoa for transit and museum purposes.

### **MBC 506: Modern Diagnosis of Bacterial Infections (3 Credit Units)**

Role of the laboratory in the diagnosis and monitoring of patients (direct examination, histopathology, antigen detection, antifungal susceptibility testing results, qPCR, etc.), limitation and use of public and specific databases for molecular identification, discussion of clinical cases. Fungal culture in histological samples, the epidemiology and changing spectrum of fungal diseases.

### **MLS 506: Research Project (6 Credit Units)**

This is a supervised research project on an approved topic to be undertaken by each student in the final year for partial fulfillment of the B. MLS degree requirements. Assessment of the project would be by grading of the project content a panel of internal assessors; including supervisors, to be chaired by the Head of Department.

## **MEDICAL IMMUNOLOGY/VIROLOGY OPTION**

### **MVI 501: Cellular Immune Responses (2 Credit Units)**

Principles and theories of adaptive cellular Immunity; T-cells, Th-1 and Th-2 cells, cytotoxic T cells N K cells, macrophages, neutrophils basophils cell mediated Immunity. APCs, MHC molecules, Myeloid cells, Lymphoid cells, bone marrow and Thymus, concept of tolerance, antigenic degradation presentation and co-stimulatory responses, Cellular interactions in adaptive

cellular Immunity, activation of lymphocytes Immunization and vaccination, delayed type hypersensitivity reaction congenital and acquired defects in T lymphocytes, etc.

**MVI 503: Infections and Immunity (2 Credit Units)**

immunology of tumor cells, Genetic correction of tumors cellular and humoral Immune responses against tumor cells, Immunological surveillance Immunotherapy; Natural resistance to infections, Immunization against viral, Parasitic, bacterial and Mycotic infections; Antibodies and Immunologic injury, Immune deficiency diseases and bacterial infection, bacterial adjuncts, Immunology of viral, Parasitic and Mycotic infection.

**MMB 507: Public Health Microbiology (3 Credit Units)**

General principles of microbial disease transmission — waterborne, airborne, food borne, arthropod-borne and contagious diseases.

Principles and techniques for water treatment. Waste water disposal, preventive measures in the control of Bacteria, Parasitic and viral infections. Vaccines and Immunization. Immunization programme and schedule (EPI).

**MVI 505: Immunology III (2 Credit Units)**

Clinical tests and predisposing factors and treatment for allergy. Combine T and B cell deficiency, deficiency of antibody mediated Immune response and disease predisposition, HIV and AIDS,

Hepatitis and rheumatoid arthritis. Diseases mediated by Immunological mechanisms, eg Asthma, hay fever, urticaria and eczema; Transfusion reaction Hemolytic Disease of the Newborn; Lymphoproliferative disorder, Immune deficiency disease, wiskot Aldrich syndrome chidiek shigashi syndrome, Di George syndrome, Huntington syndrome, lazy leucocytes syndrome and Auto Immune diseases. Immuno pathology; Diseases mediated by Immunological mechanisms, atopy e.g. asthma, hay-fever, urticaria and eczema. haemolytic disease of the newborn, auto Immune disorder, transplantation and graft rejection, glomerulonephritis, Immune complex diseases, granulomatous disease.

**MLS 503: Molecular Biology II Techniques and Applications (3 Credit Units)**

Bioinformatics: Genomic/cDNA library – preparation and isolation, cloning, primer design and RT-PCR and its application in diagnosis, Blotting (principle and application of Western, Southern and Northern blots). Purification of RNA and DNA. Transgenic animals and their uses in research. Tissue culture techniques. Use of recombinant DNA in the production of monoclonal antibodies. Genetic engineering and its application in Biotechnology.

**MLS 501: Research Methodology (3 Credit Units)**

Introduction to research methodology, collection of literature review articles. Problem definition, Sampling techniques. Experimental designs of medical and public health studies. Questionnaire design and data collection analysis. The role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects and art of scholarly publications.

**MLS 505: Laboratory Posting (3 Credit Units)**

This involves bench rotation in Virology (serology) and Immunology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on participation in the routine services of the laboratory.

**SECOND SEMESTER**

**MVI 502: Basic Immunological Techniques (2 Credit Units)**

Safety and hazard in Immunology laboratory; serological diagnosis of viral, bacterial Parasitic and Mycotic infections. Complement fixation test; neutralization test; haemagglutination test; haemagglutination inhibition test; Immunofluorescence technique; radioImmunoassay Enzyme-linked Immunosorbent assay cells and tissue culture techniques. Phagocytic function test ; T cell and B cell determination; determination of inhibitory substances; Lymphoblastosis; antigen and antibody production; serological reactions in tissue and organ transplantation, HLA system etc.

**MLS 502: Seminar (2 Credit Units)**

The student will be required to conduct literature search on a topic in medical microbiology, write up a review and present a seminar on it. Final grade on the course will be based on the literature review and seminar presentation.

**MVI 504: Molecular Basis of Immune Responses (2 Credit Units)**

Mechanisms for the development of Immune system; overview of Immune functions and its various components. Chemotaxis, cytokines and effector mechanisms of tolerance and hypersensitivity reactions. Immune Paralysis; antigen presentation; recognition of self and non-self-proteins etc.

**MVI 506: Immunopharmacology (2 Credit Units)**

Anti-inflammatory agents, antibodies and Immunopharmacological agents; Monoclonal and Polyclonal antibodies and their therapeutic applications. Introductory concept to Immunesuppressive agents' e.g azathioprine, glucocorticoids cyclosporins, Allergy and anti-allergic substances; Natural and synthetics Immuno stimulants.

**MMB 502: Medical Virology II (3 Credit Units)**

Preservation and storage of viruses. Public health approach to control of viral infections including vaccination, Immunization and herd's Immunity. Safety precautions in Immunovirological techniques. In-depth study of pathogenesis, Immunology, epidemiology and management of viruses of medical importance, including, picornaviruses, retroviruses, arboviruses, herpes viruses, hepatitis viruses, poxviruses, Rotavirus enteroviruses, Mycoplasma, rickettsiae and foot and mouth disease; Basic knowledge of diagnostic procedures using animal, egg, cell and tissue culture, serology, microscopy and staining methods. Principles of purification, concentration, Equipment Care and Maintenance, vaccine production.

**MLS 504: Laboratory Posting (3 Credit Units)**

This involves bench rotation in Virology (serology) and Immunology. The student is assessed after every bench posting on knowledge of procedure and technical competence based on participation in the routine services of the laboratory.

### **MLS 506: Research Project (6 Credit Units)**

This is a supervised research project on an approved topic to be undertaken by each student in the final year for Partial fulfilment of the BMLS degree requirements. Assessment of the project would be by grading of the project content a panel of internal assessors; including supervisors, to be chaired by the Head of Department.

## **LIST OF TEACHING STAFF**

### **DEPARTMENT OF MEDICAL LABORATORY SCIENCES**

<b>S/N</b>	<b>Name</b>	<b>Qualification</b>	<b>Rank</b>	<b>Specialization</b>
1	Dr. Isah Abubakar Aliyu	B. Sc., M. Sc., PhD, AMLSCN	Senior Lecturer	Medical Microbiology/ Molecular and Clinical Virology/ Medical Genetics
2	Dr Khadijat Abdulfatai	B. Sc., M. Sc., PhD, AMLSCN	Lecturer I	Medical Microbiology/Immunology/Molecular Diagnostics
3	Armiya'u Ahmed Yelwa	BMLS, MSc, PGDE, Ph.D (In view)	Lecturer I	Chemical Pathology/Endocrinologist
4	Sarah Nuhu kase	BSc., MSc., AMLSCN., PGDE, PhD (In view).	Lecturer I	Chemical Pathology/Reproductive Endocrinologist/Toxicologist
5	Aminu Yusuf	BSc., MSc., AMLSCN., FMLSCN., PGDE, PhD (In view).	Lecturer I	Medical Microbiology/Immunology/Molecular Diagnostics
6	Maryam Ibrahim Rimi	BMLS., M.Sc., Ph.D in view.	Lecturer II	Histopathology/Biotechnology
7	Suleiman Abdulkadir Saeed	BMLS., M.Sc., Ph.D. (In view).	Asst. Lecturer	Haematology and Blood Transfusion Sciences/ Quality Management System
8	Adamu Muhammad Bashir	BMLS., M.Sc, MBA, MPH (In view)	Lecturer II	Microbiology and Parasitology, Medical Virology

9	Haruna Danlami Sambo	BMLS., M.Sc., Ph.D. (In view).	Lecturer II	Haematology and Blood Serology/Forensic Science.
10	Garba Ninani	BMLS, MSc, PhD (in view)	Lecturer II	Haematology and Blood Transfusion Sciences
11	Jamilah Ibrahim Suleiman	BMLS, MSC (In view)	Asst. Lecturer	Chemical Pathology

### NON ACADEMIC STAFF

S/N	Name of staff	Qualification	Present rank
1	Dr. J.J Chock	BSc, MSc, PhD (Microbiology)	Chief Med Lab Scientist

### DEPARTMENT OF HUMAN ANATOMY

S/N	Name of staff	Qualification	Present rank
1.	Dr. Danladi Sambo AMAZA	B.Sc., MHPM, M.Sc., PhD.	Reader
2.	Prof. Oshiozokhai Eboetse YAMA	MBBS, NPMC, M.Sc., PhD.	Professor
3.	Dr. Samuel A. ADAVBA	MBBS, M.Sc. Human Anatomy	Lecturer I
4.	Dr. Abdulwaheed A. OYEWALE	B.Sc., PGDE, M.Sc. Ph.D.	Lecturer I
5.	Mrs. Gidok Kogi ABEDNEGO	B.Sc., M.Sc. Human Anatomy	Lecturer II
6.	Mrs. Hadiza Bello RILWAN	B. Human Anatomy Sc., M.Sc.	Lecturer II
7.	Dr. Jamilu HARUNA	MBBS, MDRMDS	Lecturer II
8.	Mrs. Aisha AMINU	BS. MSc. Human Anatomy	Assistant Lecturer
9.	Dr. Hafsat Balarabe SHEHU	MBBS	Lecturer II
10.	Mal. Idris Muhammad	B.Sc. Human Anatomy	Graduate Assistant

### NON-ACADEMIC STAFF

S/N.	Name of staff	Present rank	Qualification
1.	Mal. Mukhtar ABDULKARIM	HND Business Admin.	Senior Executive Officer
2.	Mal. Aliyu GARBA	ND, HND, PGDM	Senior Lab. Technologist
3	Mal. Nura UMAR	ND, HND.	Senior Lab. Technologist

4	Mr. Auwal K. FALALU	B. Sc. Human Anatomy	Laboratory Technologist II
5	Mrs. Bilkisu A. LIMAN	B.Sc. Human Anatomy	Laboratory Technologist II
6	Mr. Nura IDRIS	Diploma Public Admin; Cert. in Computer Science	Principal Secretarial Assistant
7	Mohammed ABDULLAHI	Cert. in Public Admin	Laboratory Attendant
8	Mr. Musa DANIEL	SSCE & Advanced Refresher Course	Senior Driver

#### DEPARTMENT OF HUMAN PHYSIOLOGY

S/N	Name of staff	Qualification	Present rank
1	Dr. Muhammed Kadir Amed	B.Sc., M.Sc., PhD.	Reader
2	Dr. Goji Teru A.D	B.Sc., M.Sc., PhD.	Reader
3	Dr. Ciroma Fatima Lami	B.Sc., M.Sc., PhD.	Senior Lecturer
4	Dr. Yusuf Suraj Muhammad	B.Sc., M.Sc. Ph.D.	Lecturer I
5	Dr Ohunene Avidime Makoju	B.Sc., M.Sc. Ph.D	Senior Lecturer
6	Dr. Abdurrazak Abubakar	B.Sc., M.Sc. Ph.D	Senior Lecturer
7	Dr. Sada Maryam Naiya	B.Sc., M.Sc. Ph.D	Lecturer I
8	Dr Danboyi Timothy	MBBS. MSc.	Lecturer I
9	Dr Ja'afar Fatima Yahaya	MBBS, MSc.	Lecturer I
10	Idris Aisha	B.Sc. MSc.	Lecturer II

#### DEPARTMENT OF BIOCHEMISTRY

S/N	Name of staff	Qualification	Present rank
1	Prof. Richard Auta	B.Sc., M.Sc., PhD.	Professor
2	Prof. T. Bulus	B.Sc., M.Sc., PhD.	Professor
3	Dr. M. Dakare	B.Sc., M.Sc., PhD.	Reader



4	Dr. S.A James	B.Sc., M.Sc. Ph.D.	Senior Lecturer
5	Dr. P.M Waziri	B.Sc., M.Sc. Ph.D	Senior Lecturer
6	Dr. Maimuna Zubairu	B.Sc., M.Sc. Ph.D	Lecturer II
7	Dr. Hauwa Y. Bako	B.Sc., M.Sc. Ph.D	Lecturer II
8	Umar F. Halliru	BSc. MSc.	Lecturer II
9	Barakat Abdullahi	BSc. MSc.	Lecturer II
10	Aliyu Yakubu	BSc. MSc.	Assistant Lecturer
11	Hussaini Ashafa	B.Sc. MSc.	Assistant Lecturer
12	Hafsat Rufai	B.Sc. MSc.	Assistant Lecturer