

**SCHOOL OF BASIC MEDICAL SCIENCES  
COLLEGE OF MEDICAL SCIENCES**

**UNIVERSITY OF BENIN CITY  
BENIN CITY**

**STUDENTS HANDBOOK & GUIDE**

**FOR  
UNDERGRADUATE PROGRAMMES**

**IN  
ANATOMY  
MEDICAL BIOCHEMISTRY  
MEDICAL LABORATORY SCIENCE  
NURSING  
PHYSIOLOGY  
PHYSIOTHERAPY  
RADIOGRAPHY**

**2014/2016**







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## **Foreword**

It is with great pleasure that I welcome you to your School – SCHOOL OF BASIC MEDICAL SCIENCES, which was created in December 2003 as one of the component Schools in the College of Medical Sciences, and finally took off in January 2004. The School currently has seven (7) departments and runs undergraduate programs for Bachelor’s degrees in Anatomy, Medical Biochemistry, Medical Laboratory Sciences, Nursing Science, Physiology, Physiotherapy and Radiography. It also runs postgraduate programs i.e. M.Sc, M.Phil and Ph.D in some of these departments. In addition, the School services the other Schools within the College – Schools of Medicine and Dentistry, as well as some other Faculties in the University – Faculties of Life Sciences and Pharmacy.

This handbook, which should be your constant companion and guide, provides detailed information about the Administrative structure and staffing in the School and Departments, the academic programs and curricula, the University regulations in operation in the School, and other specific requirements of the School.

It is our hope that by your hard work, strict adherence to the University rules and regulations and observance of all that is expected of you, we can partner with you to ensure that you are found worthy in character and in learning at the end of your training in order to qualify for the award of degrees from the University of Benin.

I wish you all the best.

**PROFESSOR M.I. EBOMOYI (MRS)**  
**DEAN, SCHOOL OF BASIC MEDICAL SCIENCES.**

**DEAN'S OFFICE STAFF**

S/N	NAME	QUALIFICATIONS.	RANK
1.	Prof. (Mrs.) M.I. Ebomoyi	B.Sc., M.Sc (Ibadan), Ph.D (Benin) Cert in Basic Computing (London)	Dean
2.	Dr. H.B. Osadolor	Ph.D(Benin), FMLSAN, FASCP (Benin) MSc	Assist. Dean
3.	Pastor M. I. Owie	N.C.E, (Distinction) B.Ed, MPA (Pub. Admin) (Benin)	Prin. Asst. Registrar/School Secretary
4.	Mrs. E. Osadolor	B.A English Language (Ekpoma) Diploma in Law	Admin. Officer
5.	Mrs. Blessing Idemudia Akenzua	B.A. English/Literature Abia State University S.S.C.E	Admin. Assist.
6.	Mrs. Pauline Omoh Enegbuma	B.Sc. Sociology, University of Maiduguri	Snr. Executive Officer
7.	Mr. Osunde Ernest	B.Sc. Pol. Sci. & Public Admin. (University of Benin)	Snr. Executive Officer
8.	Miss. Ideweke, Iyinome Uwaila	B. A. Education English, Diploma in Social Works University of Benin	Higher Executive Officer
9.	Mr. John Uwa Osemwegie	B.Sc. Accounting, Dip. In Accounting, GCE O/L	Higher Executive Officer
9.	Mrs. Itohan I. Igiebor	Dip. In Social Works (University of Benin)	Executive Officer
10.	Mr. J.S. Ogbemudia	Diploma in Computer, W/Processing, G.C.E. OGT of the Auchi Polytechnic 120WPM typewriting 50WPM 1 <sup>st</sup> Class, Pitman English C.E. 1 <sup>st</sup> Class	Principal Confidential Secretary I
11.	Mr. Joseph Okoh	Advanced T/W (First Class) Pitman Examinations (London)	Chief Typist

		Intermediate T/W (First Class) Pitman Examinations (London) English (CE) Intermediate – Pitman Examinations (London), GCE O/L FSLC Grade 'A' with Distinction	
12	Mrs. Meriamu Abubakar	S.S.C.E.	Clerical Assistant
13	Mr Mathew Oseha	G.C.E. O/Level	Clerical Officer
14.	Mrs. Grace Ozigazu	School Leaving Certificate (FSLC)	Office Assistant II
15	Mr Osaro.O.Idahosa	School Leaving Certificate	Driver II

### 3. A BRIEF HISTORICAL BACKGROUND OF THE SCHOOL OF BASIC MEDICAL SCIENCES.

The University of Benin Edict No. 3 of 1975 and the University of Benin Transitional Provision degree No. 20 of 1975 under sections 25-29 established the College of Medical sciences. The enabling law provided inter alia:

“The College shall consist of

- a) The School of Medicine
- b) The School of Dentistry, and
- c) Any other Schools, Institutes, Centers, Research and Teaching units as may from time to time be prescribed or established as part thereof”

At the onset, the College had the following schools and an Institute namely,

- a) School of Medicine
- b) School of Dentistry,

- c) School of Pharmacy, and
- d) Institute of Child Health,

In 1992, the collegiate system was introduced throughout the University. The College of Medical Sciences, the only College prior to the new arrangement, retained its original components. However, the collegiate system was abrogated in 1994. When the College of Medical Sciences was resuscitated in September 1999, it reverted to the original mandate under which it was originally established but without the School of Pharmacy.

At the 186<sup>th</sup> regular meeting of senate held on Tuesday 23<sup>rd</sup> December 2003, Senate approved the proposal for the establishment of a School of Basic Medical Sciences to be based in the College of Medical Sciences.

### 4. JUSTIFICATION FOR SCHOOL OF BASIC MEDICAL SCIENCES

Arising from the need for the growth of the College of Medical Sciences and in particular the development of manpower in the basic medical sciences, and also to give Medical and Dental students a sound background in the pre-clinical subjects, there has been a strong desire among the academic staff of the College to create a School of Basic Medical Sciences within the College. It was now a universal practice among Colleges of Medicine in the country and beyond, to have Schools of Basic Medical Sciences to give impetus to accelerated growth of the Basic Medical sciences disciplines. Indeed, it is to be noted that among first generation universities in Nigeria, the University of Benin seemed to be the only institution without a School of Basic Medical Sciences. Such a school will provide an opportunity for future growth of the College through the development of related professional courses and disciplines.

### 5. SCHOOL OBJECTIVES

- a) To organize and offer courses of instruction leading to the award of degree, diplomas, certificates and other

- University qualifications in Basic Medical Sciences and such related studies as may be prescribed by the Senate
- b) To develop manpower in Basic Medical Sciences for the future growth and expansion of research and education in health-related disciplines.
  - c) To create a conducive and healthy academic and professional environment that would allow for the development and growth of its component parts and that of the college of Medical Sciences.
  - d) To provide equal opportunity for all staff in accordance with the tenets of academic freedom.
  - e) To promote research efforts of staff and students by arranging and organizing and co-coordinating research activities through conferences, seminars, workshops, etc.

#### 6. ADMINISTRATIVE STRUCTURE OF THE SCHOOL

The School shall consist of:

- i. Dean of the school
- ii. Assistant Dean
- iii. Heads of component Departments and supporting staff
- iv. Administrative officers of the school.

#### 7. DEPARTMENTS OF THE SCHOOL

The School of Basic Medical Sciences took off initially in the 2003 / 2004 academic session with the Departments of Anatomy, Physiology and Medical Biochemistry. This was accelerated by the facilities and staff on ground, as well as the capacity of the university to develop several new programmes simultaneously. Accordingly, two other departments (Medical Laboratory Sciences, and Nursing) took off in 2005/2006 while departments of Physiotherapy and Radiography are just starting. The Academic briefs of the Departments are provided below.

#### 8. ACADEMIC PROGRAMMES:

The school will offer undergraduate courses to develop manpower in the relevant disciplines. In addition, the academic

programmes of the school will be tailored towards training of pre-clinical students in preparation for their clinical studies. Thus, the academic and degree programmes to be offered by the school include the following:

##### 8a. Undergraduate Degree programmes:

- Bachelor of Science (B. Sc.) in Anatomy
- Bachelor of Science (B.Sc.) in Medical Biochemistry,
- Bachelor of Science (B. Sc.) in Physiology
- Bachelor of Medical Laboratory Sciences, (B. M. L. Sc.)
- Bachelor of Nursing Science (B.N. Sc.)
- Bachelor of Physiotherapy (B.PT)
- Bachelor of Science (B.Sc.) in Radiography

##### 8b. Other Programmes handled by the School:

- Part II of the MB BS degree of the School of Medicine
- Part IA of the BDS degree of the School of Dentistry
- O.D. degree of the Faculty of life Sciences.
- B. Pharm./Pharm. D. degree of the Faculty of Pharmacy

#### COURSE CREDIT AND WORKLOAD FOR UNDERGRADUATE DEGREE PROGRAMMES:

##### 9. FULL TIME PROGRAMMES

All courses are run on the university credit system. Credit is defined as a series of lectures/tutorials of one to three hours per week lasting a semester or a three-hour practical class per week or an equivalent amount of study or any combination of these. The minimum number of course credits for each level of the degree programme is specified under the guidelines for each subject.

The following represents levels of degree programme:

- 100 – 199 1<sup>st</sup> year degree programme or 100 level.
- 200 – 299 2<sup>nd</sup> year degree programme or 200 level.
- 300 – 399 3<sup>rd</sup> year degree programme or 300 level.
- 400 – 499 4<sup>th</sup> year degree programme or 400 level.
- 500 – 599 5<sup>th</sup> year degree programme or 500 level.

The character codes for courses in the School are:

- ANT – Anatomy
- MBC – Medical Biochemistry
- MLS – Medical Laboratory Sciences
- NSC – Nursing Science.
- PHS – Physiology
- PST\_ Physiotherapy
- RAD\_ Radiography

The **minimum** number of credits required to remain in the school and to move to the next level is 22 credits (including GST courses), whilst the **minimum** number of credits required to remain in the school on probation is 11 credits. The total number of credits required to graduate shall be 130, including GST credits (for a 4 year course), and 100 for a direct entry 3-year course. The total number of credits required to graduate shall be 180, including GST credits (for a 5 year course), and 150 for a direct entry 4 year course.

#### 10. DURATION OF FULL TIME DEGREE PROGRAMME

The minimum number of academic years required for the award of the B.Sc. (Hons.) degree shall be 4 (through JAMB) or 3 (Direct entry) years.

#### 11. WORK LOAD

A student shall normally in any one academic year be allowed to register for and take a minimum of 30 credits and a maximum of 50 credits. This means that a student cannot be credited with more than 50 credits at the end of one academic year.

#### 12. SCHOOL EXAMINATION REGULATIONS

The general University Regulations on examinations shall apply to all degree programmes in the school. There shall be an examination, at the end of the Semester, in every course. Credit for that course will be earned on passing the examination. Furthermore, the University Medical Officer shall excuse no student from taking the whole or part of any examinations except on the strength of a medical certificate to the effect that he/she cannot take or continue the examination. Failure to write an examination without an acceptable reason means a failure in that examination. Any such case must be communicated within two weeks from the date of the examination through Head of the Department who will then make recommendations to the School's Board of Studies. The examinations in the School shall take the form of written papers, viva voce, practical, clinical, and a submission of projects, assessment of course work or by a combination of the above.

#### Matters Relating to the Conduct of Examinations

These recommendations relate to the activities performed during the actual conduct of examinations.

#### REGULATIONS GOVERNING THE CONDUCT OF UNIVERSITY EXAMINATIONS:

##### DISCIPLINE DURING EXAMINATIONS:

- a Instruction to the Invigilators.
  - i "Invigilator", refers to any senior staff member officiating during an examination and must not be one of the candidates to be examined.
    - Course Teachers are invigilators of their courses and shall remain in the examination Hall throughout the examination and collect the scripts.

- ii There shall be a Chief Invigilator appointed by the Head of Department or the Dean, preferably of the rank of Senior Lecturer and above. The role of the Chief Invigilator is to supervise and ensure that the conduct of the examinations follows the laid down regulations. He /she shall make a report after the examination using the approved format. The Course Teacher shall not be the Chief Invigilator of the examination on his/her Course.
- iii It shall be the first duty of the Invigilators to exercise constant and vigilant supervision over the candidates. The Chief Invigilator shall use his discretion when handling cases of misconduct and ill-health. They shall send a report on each to the Head of Department and the Dean of the Faculty immediately after the examinations and definitely not more than 24 hours.
- iv An Invigilator shall report to the Examination Hall 30 minutes before the examination is due to start. There shall be a minimum of one(1) Invigilator per 50 Candidates
- v The Chief Invigilator or his assistant shall sign each Examination Answer Booklet before the commencement of each examination. This is to prevent illegal issuance of booklets for illicit examinations.
- vi Before the examination begins, the Chief Invigilator shall announce to the students that all foreign and forbidden materials should be removed from their persons and from the Hall.
- vii While the examination is in progress, no person other than the Invigilators, the attendant, Dean of the Faculty/School or his representative, Head of Department, the Registrar's representative (Exams

- & Records) and the Medical Personnel shall be allowed to enter Hall.
- viii The time allowed for an examination paper as indicated in the timetable, must be strictly obeyed.
- ix Each of the sealed packets of the Examination Paper must be opened in the presence of the Candidates.
- x Immediately after the paper must have been distributed to all Candidates, the Chief Invigilator shall ask the Candidates to see that they have the papers for which they have been entered. Then and only shall the Chief Invigilator give a signal for the examination to start.
- xi Candidates shall be admitted into an examination up to the first half hour after the start of the examination on the permission of the Chief Invigilator. Cases of admittance after the first half hour of the examination shall be reported to the Chief Examiner and the Faculty/School Examination Officer who shall inform the Board of Examiners which shall decide on the cases.
- xii It is essential that Candidates enter and leave the Hall through one entrance to enable the Invigilators satisfy themselves that nothing which is unauthorized is brought in or taken out.
- xiii No Candidates may leave the Examination Hall without the express permission of the Chief Invigilator. Candidates wishing to go to the Toilet or to the First-Aid Room must be accompanied by an Invigilator/Attendant.
- xiv No Candidates may quit the Examination Hall until 30 minutes has elapsed. A Candidate who wants to leave before the end of the examination must drop his/her Question paper and Scripts before leaving the Hall. No question paper shall be removed from the Hall before the first hour of the examination has elapsed.

- xv Reasonable silence shall be maintained throughout an examination by both the Invigilators, other Officials and the Candidates.
- xvi Invigilators shall tell Candidates the time at appropriate intervals during the period of an examination.
- xvii At the close of each examination, Candidates shall be asked to hand over their Scripts to the Invigilators while Standing. The Chief Invigilator with the assistance of Invigilators shall count these over and four copies of the Question Paper to the packet of Scripts. The packets shall then be handed over to the Course Teacher who shall verify and sign the receipt.
- xviii The attendant shall be responsible for the circulation of the Attendance Register which shall be collected by the Chief Invigilator at the end of each examination; one copy is to be returned to the Internal Examiner and one copy shall be collected by the Chief Invigilator at the end of each examination; one copy is to be returned to the Internal Examiner and one copy to the Exams and Records Division.
- xix No Candidate shall be allowed to depart from the Examination Hall without handing in his/her Scripts. The Chief Invigilator shall assign Invigilators the responsibility for collecting the Scripts from the Candidates who shall remain standing.
- xx Any Candidate found to be or is suspected of infringing the provisions of the regulations or in any way cheating shall immediately be given three (3) copies of **Examination Misconduct Forms** for completion. The original copy with relevant exhibits shall be handed over to the Dean through the Head of department for further action while the duplicate and triplicate copies shall be retained

by the Candidate and Examinations and Records Office, respectively. The Chief Invigilator shall submit the report immediately on the prescribed Examination Misconduct Form to the Faculty/School Examination Officer and the Dean. The Candidate concerned shall be allowed to continue with the examination provided that he causes no disturbance. The Dean shall cause the circumstances to be investigated and report to the Vice Chancellor through the Provost for a final determination of the case.

- xxi The Panel to investigate the alleged misconduct shall be ad hoc, to give the Dean a free hand in selecting members who will be immediately available for the assignment in view of the urgency. The report of the investigating Panel must reach the Vice Chancellor not later than two (2) weeks after the conclusion of the Semester Examination. The Vice Chancellor shall in turn inform the Faculty/School and college of his/her decision on the misconduct within two (2) weeks.
- xxii All students involved in irregular assistance or cheating during examination shall write statements on the spot before being allowed to continue with the examination. Refusal of a student to write a statement on the spot shall be regarded as examination misconduct.

#### Duties of Attendants:

Attendants shall be responsible for:

- i Distribution of Examination Answer Booklets, Strings, and other materials specified.
- ii During the examination, attendants shall be present to supply supplementary Answer Booklets, Strings, Graph Sheets, etc. to candidates.

- iii Accompany Candidates to Toilet or to the First-Aid Room;
- iv Going for a member of the University Health Services when instructed by the Invigilator;
- v Any other duty assigned by the Registrar (or his/her representative) or Chief Invigilator.

**Instructions to Students**

- i Only duly Matriculated/Registered Students are eligible to take examinations.
- ii Candidates must attend punctually at the times assigned for their papers and they must be in the Examination Hall at least 30 minutes before the time that the examination is due to start. Candidates shall not be allowed to enter the Examination Hall until invited by the Invigilator
- iii A candidate is required to deposit any Handbag, Briefcase, or any other prohibited material at the Chief Invigilator 's Desk ( or a desk provided for that purpose) before the start of an examination.
- iv Candidate shall bring with them to the Examination Hall, their own Ink, Pens and Pencils and any other which are permitted by these regulations. Absolutely no book, printed or written document or other communication gadgets or unauthorized aid shall be taken into an Examination room by any candidate.
- v A Candidate shall bring his identity card to each examination and display it in a prominent position on his desk.
- vi A Candidate shall write his/her Examination Number, not his/her name, distinctly at the top of the cover of every Answer Book and every separate sheet of Paper.

- vii Each Candidate shall complete the Attendance Register in triplicate.
- viii During the examination, a Candidate may leave the Examination hall temporarily, with the permission of the Invigilator only if accompanied by an Attendant. A Candidate who leaves the Examination Hall shall not be re-admitted unless throughout the period of absence he has been continually under supervision of an Invigilator or an Examination Attendant.
- ix A Candidate shall not leave the Examination Hall until the first 30 minutes has elapsed and must be with the special permission of the Chief Invigilator. Such Candidate must drop his/her Question Paper and Answer Booklet before leaving.
- x A Candidate must not give assistance to any other Candidate or permit any other Candidate to copy from or use his papers. Similarly, a Candidate must not directly or indirectly accept assistance from any other Candidate or use any other Candidate's papers.

**EXAMINATION MISCONDUCT**

**The following sanctions shall apply to cases of examination misconduct as stipulated below.**

S/N	MISCONDUCT	SANCTION
1	Proven cases of fore-knowledge of Examination Questions (Leakage)	Expulsion of all involved.
2	Coming into Examination Hall with extraneous materials	Rustication for a minimum period of 4 Semesters or Expulsion if fore-knowledge of

		Questions is proven.
3	Writing on any materials in the Examination Hall, other than the Answer Booklet	Letter of warning
4	Non production of Identity card or authorized letter of identification before and during examination.	To leave the Examination Hall immediately
5	Any form of unauthorized communication between and among students during examination	To lose 10 minutes of examination time; if it persists, relocate the student; further persistence cancel the paper.
6	Impersonation at Examination	Expulsion of all involved.
7	Refusal to fill Examination Misconduct Form	Rustication for (2) Semesters plus penalty for the original offence.
8	Attempt to destroy or actually destroying materials of proof of cheating	Rustication for (2) Semesters plus penalty for the original offence.
9	Refusal to obey invigilator's instructions such as: (i) Writing after the Examination Has been Stopped. (ii) Non compliance with the invigilator's sitting arrangement	(i) Letter of Warning (ii) To leave the hall and carry-over the course
10	Refusal to submit Answer scripts (used and unused) at the close of examination	Rustication for a minimum period of (2) Semester.
11	Smuggling of Question papers and	Expulsion

	Answer Booklets out of the Hall for help and returning with Answer Scripts	
12	Failure to write matriculation numbers on Answer Booklet or to sign Attendance Sheet	Letter of Warning
13	Writing of candidate's names on Answer Booklets	Letter of Warning
14	Leaving Examination Hall without permission	To carry-over the course and Letter of Warning
15	Failure to draw a line through each blank space at the end of each answer	Letter of Warning
16	Unruly behavior in the Examination Hall such as smoking, drinking of liquor, noise etc	Verbal warning by Invigilator. If unruly behavior persists, to leave the Hall and carry over the course
17	Proven cases of physical assault on Invigilator/Attendant	Expulsion
18	Failure to appear before Misconduct Panel	Guilty as charged. Indefinite suspension pending appearance before the Panel.
19	Any students with three(3) letters of warnings	Rustication for a minimum period of one (1) Session.
20	Any other cases of Examination malpractice not specified	Punishment as appropriate.

### 13. RE-SIT EXAMINATIONS

There is no longer re-sit Examinations in the University of Benin.

**14. INTERNAL EXAMINERS.**

- a. The Head of Department shall be the Chief Examiner for his Department. He shall appoint an Examination Officer who shall be responsible to the Head of the Department and take charge of the conduct of Examinations and collation of results within that Department.
- b. Examination results in each Department shall be considered first by the Departmental Board of Examiners made up of the academic staff before they are presented by the Head of Department to the school Board of Studies/Examiners. The major role of the Departmental Board of Examiners is to prepare and sign examination papers, to determine the pass and failure and the classification of degree, and to inform school's Board of any observations as may be requested by the External Examiner.
- c. The School Board of Examiners shall consist of all academic staff of the school and shall meet at the end of each semester to consider and approve the results of all examinations held in the Faculty in that semester for the subsequent presentation to and approval by the Senate

**15. EXTERNAL EXAMINERS**

External Examiners appointed by the Senate on the recommendation of the School Board of Studies, are to participate in the vetting of examination question papers and moderation of answer scripts for all examinations at the 400/500 level courses. He/she is also to participate in the determination of overall results at the Departmental level.

**16. NUC APPROVED SCORING AND GRADING SYSTEM**

The School shall adhere strictly to the NUC approved scoring as shown below:

PERCENTAGE SCORES	LETTER GRADE	GRADE POINT
70 - 100	A	5
60 - 69	B	4
50 - 59	C	3
45 - 49	D	2
40 - 44	E	1
0 - 39	F	0

**17. CLASSIFICATION OF DEGREE**

A Grade Point Average (GPA) shall be calculated for each level of course. The student's final grade from the sum of the weighted Grade Point Averages for each level of the courses is as follows

3 year Degree Programme	4 year	Degree
100 series – Nil	100 series – 10%	
200 series – 20%	200 series – 20%	
300 series – 25%	300 series – 30%	
400 series – 55%	400 series – 40%	

**NB A.** \*Core courses are courses, which all students must take and pass before they can graduate

**B.** +Mandatory courses are courses, which students must take but do not have to pass before they can graduate.

**C.** eElective courses are courses which students do not have to take or pass before they can graduate.

The class of degree is determined by the final grade (GPA) as follows:

First Class Honours	4.50 – 5.00
Second Class Upper Division	3.50 – 4.49
Second Class Lower Division	2.50 – 3.49
Third Class	1.50 – 2.49
Pass	1.00 – 1.49
Less than 1.00	Fail

**18. CONTINUOUS ASSESSMENT**

Continuous Assessment (CA) during the semester shall form part of the end-of-course grade. Its overall contribution shall not exceed 25% of each course examination.

**19. END-OF-YEAR OVERALL ASSESSMENT FOR 100, 200 AND 300 LEVEL STUDENTS**

The pass mark in the school is 40%. A student shall be deemed to have passed his examination if he passes in all the compulsory and required courses he registered for during the academic.

**20. CARRY OVER**

A candidate who fails any course(s) during any academic year may repeat or carry over such course(s) while at the next higher course level, provided that the candidate meets the requirement to remain in the faculty at the end of the academic session.

**21. PROBATION/WITHDRAWAL FROM THE FACULTY**

- a. Candidates who did not earn the minimum number of credits needed to qualify them to move to the next higher level but earn not less than 50% of the minimum number of credits needed to remain in the faculty may wish to remain in the school on probation.
- b. To remain in the Faculty at both 1<sup>st</sup> and 2<sup>nd</sup> Semesters, a candidate must accumulate a minimum of 18 credits in anyone academic session. However, a candidate who accumulates less than 50% of the credits needed to remain in the school will be advised to withdraw.

**22. WITHDRAWAL FROM SCHOOL**

- (a) Students who accumulate 11-21 credits in the session are either to seek Inter-Faculty transfer or remain in the faculty on probation.

- (b) Students who fail to accumulate up to 11 credits at the end of the Second Semester examinations will be asked to withdraw from the school.
- (c) Any Students who has previously transferred from another faculty or gone on probation and still fails to obtain 22 credits after the sessional examination shall withdraw from the faculty and university.
- (d) Without prejudice to (a-c) any student who fails to register for the session or does not produce satisfactory reasons for missing his or her examinations shall be deemed to have voluntarily withdrawn.
- (e) The Senate (if satisfactory reasons are given) may grant a student temporary withdrawal from the Faculty. He could be allowed to register and take the examination in the required courses at the next available opportunity, provided he does not exceed the maximum number of year required for the degree.

**23. FINAL DEGREE EXAMINATION**

To qualify for the award of a degree in the School of Basic Medical Sciences, a candidate must satisfy the following conditions.

- (a) The candidate must pass all the courses and prescribed specialized courses in the school and obtain the prescribed minimum total credit requirements.
- (b) The candidate must complete and pass the final year project.

**24. FAIL CANDIDATES IN FINAL YEAR**

Any 400/500 Level student who at the end of the final year Examinations accumulates less than the prescribed total minimum credits or does not pass in all the required course, but who has accumulated the required number of credits to remain in the

faculty, will be required to register or/take the courses in the following session and to sit for the appropriate examinations.

## **ADMISSION REQUIREMENTS FOR UNDERGRADUATE COURSES IN THE SCHOOL OF BASIC MEDICAL SCIENCES.**

### **GENERAL ADMISSION REQUIREMENTS**

#### **Admission Requirements for Undergraduate Degree Programmes:**

- a. **UME:** Admissions into the undergraduate programmes of the schools will be based on JAMB criteria. These include five credits in WASC (SSCE), GCE or NECO in English, Mathematics, Physics, Chemistry and Biology in not more than two sittings. It is also possible to admit students into the 2<sup>nd</sup> year of the study through the direct entry process. In this case, the candidate is expected to have satisfied the minimum requirements at the GCE (Advanced Level) studies in the relevant subjects. Also, candidates are expected to satisfy the minimum requirements set out by the University of Benin.
- b. **DIRECT ENTRY:** 1. Candidates holding three GCE (A/L) in Biology, Chemistry and physics plus O/L credit in five other subjects including Mathematics, Physics, Chemistry, Biology and English. 2. Transfer from other Faculties of the University. 3. A B.Sc. degree in relevant Science discipline.

### **SPECIFIC DEPARTMENTAL REQUIREMENTS**

#### **1. ANATOMY**

- a. **JAMB:** Candidates having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and Chemistry will be qualified for admission, plus an appropriate score in the JAMB.
- b. **DIRECT ENTRY.** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O'Level credit in five other subject including Mathematics, Physics, Chemistry, Biology and English.

#### **2. PHYSIOLOGY**

- a. **JAMB:** Candidates having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and chemistry will be qualified for admission, plus an appropriate score in the JAMB.
- b. **DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O' Level credit in five other subjects including Mathematics, Physics, Chemistry, Biology and English.

#### **3. MEDICAL BIOCHEMISTRY**

- a. **JAMB:** Candidate having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and Chemistry will be qualified for admission, plus an appropriate score in the JAMB.
- b. **DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O' Level credit in five other subject including Mathematics, Physics, Chemistry, Biology and English.

#### **4. NURSING**

- a. **JAMB:** Candidate having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and Chemistry will be qualified for admission, plus an appropriate score in the JAMB.  
**DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O' Level credit in five other subject including Mathematics, Physics, Chemistry, Biology and English.

#### **5. MEDICAL LABORATORY SCIENCES**

- JAMB:** Candidates having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and chemistry will be qualified for admission, plus an appropriate score in the JAMB.
- DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology Chemistry and Physics plus the O' Level

credit in five other subjects including Mathematics, Physics, Chemistry, Biology and English.

**6 PHYSIOTHERAPY**

a. **JAMB:** Candidate having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and Chemistry will be qualified for admission, plus an appropriate score in the JAMB.

**DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O' Level credit in five other subject including Mathematics, Physics, Chemistry, Biology and English.

**7 NURSING**

a. **JAMB:** Candidate having the SSCE (or the equivalent) with credit in five subjects of English, Mathematics, Biology, Physics and Chemistry will be qualified for admission, plus an appropriate score in the JAMB.

**DIRECT ENTRY:** Candidates who hold three GCE (A/L) in Biology/Zoology, Chemistry and Physics plus the O' Level credit in five other subject including Mathematics

**DEPARTMENT OF ANATOMY  
B.Sc DEGREE PROGRAMME**

**ACADEMIC STAFF OF THE DEPARTMENT OF ANATOMY**

S/NO	NAME	QUALIFICATIONS	RANK
1	ATAMAN JACOB EHIAGWINA (Dr.)	MBBS; M.Sc.; M.Sc. (Benin)	SNR LECTURER/HOD.
2	D. BAXTER-GRILLO (Prof.)	L.R.C.P.I; L.R.C.S.I; D.C.H.FNMC; PhD	PROFESSOR
3	Dr. F.A.E Om'Iniabohs	BSc,PhD,FRMS	SNR LECTURER
4	EZE GERALD IKECHI (Dr.)	FWACP, M.Sc.	SNR LECTURER
5	SAKPA CHRISTOPHER LUCKY (Dr.)	MBBS; M.Sc.	LECTURER I
6	INNIH SILVANUS (Mr.)	B.Sc.; M.Sc.	LECTURER II
7	MOMODU OGHENAKHOGIE (Mr.)	B.Sc.; M.Sc.	LECTURER II
8	ODIASE DANIEL ENOHENSE (Dr.)	MB.BS; M.Sc.	LECTURER II
9	IDEMUDIA U. OSAGIE (Dr.)	MB.BS	LECTURER II
10	OBAYUWANA EDOBOR (Dr.)	B.Sc.; MB.BS	LECTURER II
11	ESEOHE VENESSA OIGBOCHIE (Dr.) Mrs.	MBBS; M.Sc.	LECTURER II
12	EZEUKO VITALIS CHUKWUMA (Mr.)	B.Sc.; M.Sc.	LECTURERII
13	IMAFIDON ENDURANCE (Dr.)	MBBS	LECTURER II
14	ENOGIERU ADAZE BIJOU (Mr.)	B.Sc.; M.Sc.	LECTURER II
15	OMORUYI SYLVESTER IFEANYI (Mr.)	B.Sc.; M.Sc.	LECTURER II
16	IGHALO EDWIN EBHO- ORIAZE (Dr.)	MBBS	LECTURER II
17	ADELOSOYE ALEX ADEDOTUN (Dr.)	MBBS	LECTURER II
18	EHIMIGBAI, A. ORIOLA (Dr.)	MBBS	LECTURER II

19	EHI-OMOSUN MABEL (Dr.) Mrs.	MBBS	LECTURER II
20	BALOGUN TAIWO JELILAT	B.SC. (Anatomy)	GRAD. ASST.

#### LIST OF NON-ACADEMIC STAFF IN (20/8/2014)

S/NO	NAME	QUALIFICATIONS	RANK
1	BRAIMAH COMFORT O. (Mrs.)	AIMLS; MLS	SNR. MED. LAB. SCIENTIST
2	AGHAMA HELEN (Mrs.)	B.Sc.	SEO
3	NWABEZE, CE'PHAS A.I. (Esq.)	LL.B, B.Sc.	HEO
4	EHIZOJIE A. PROMISE (Esq.)	LL.B, B.L	HEO
5	OSAMA SOPHIA IVIE	B.Sc. (Microbiology)	LAB. TECH II
6	AKEREDOLU OLUWAGBENGA O.	B.Sc. (Anatomy)	LAB. TECH II
7.	AIYEVBOMWAN O. WILLIAM	B.Sc. (Anatomy)	PROSECTOR II
8	EDIGIN SAMUEL O.	G.C.E. O/L	SNR. LAB. SUP.
9	EHIOROBO MICHAEL	G.C.E. O/L	SNR. LAB. SUP.
10	EDIGIN OMODAMWEN	G.C.E. O/L	SNR. LAB. ASST.
11	EHIGIAMUSOE FESTUS	G.C.E. O/L	SNR. LAB. ASST.
12	OGIZIEN MICHAEL	1 <sup>ST</sup> Sch. Leaving Certificate	DRIVER

#### PHILOSOPHY AND OBJECTIVES:

The Bachelor of Science (B. Sc.) programme in Human Anatomy is designed to provide adequate and intensive training in human and cell biology of related disciplines in health sciences such as Physiology, Biochemistry, Radiology, Medical Laboratory Sciences, Nursing Science Physiotherapy, and Social science. Teaching will be clinically oriented to ensure that products of the programme would be able to render the most required assistance

as Anatomy teachers in medical institutions, research and hospital laboratories. Graduates of the programme will be well equipped with sufficient theoretical and practical knowledge and thus eligible for higher degree studies in any aspect of Anatomy and its related discipline.

#### PHILOSOPHY, OBJECTIVES AND SCOPE

The objective of the anatomy course is to provide the undergraduate student with a programme of course works and techniques that will enable him to become scholarly contributors to the field of Anatomy. It is anticipated that many of the graduate would advance further to become teachers of Anatomy. However, some may choose to go into positions in government laboratories and in physical and health education sectors as well as in sports.

The human Anatomy course is designed to provide the undergraduate student with basic knowledge of several sub-disciplines of anatomy, including gross anatomy, developmental anatomy (embryology), cell biology, histology and neuroanatomy. Core courses in other areas of biomedical science ensure a broad area in which to build a research career.

#### DEGREE PROGRAMME AND REQUIREMENTS

The degree programme will last three years for direct entry students and four years for students admitted through JAMB. To be eligible for admission to a degree of B. Sc. in Anatomy, a candidate should have

- a. Satisfied the normal University requirements.
- b. Satisfied the approved school of basic medical science requirements in respect of work load, registration for courses and programme duration. Satisfied the departmental requirements as contained below.

**FIRST YEAR (100L) COURSES FOR THE DEPARTMENTS OF ANATOMY, MEDICAL BIOCHEMISTRY, PHYSIOLOGY, MEDICAL LABORATORY SCIENCES AND NURSING IN THE SCHOOL.**

**FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>COURSE CREDIT</b>
CHM 111	General Chemistry I	3
CHM 113	Organic Chemistry I	3
PHY 111	Mechanics, Thermal Physics & Properties of Matter	3
PHY 113	Vibrations, Waves & Optics	3
PBB 111	Diversity of Plants	3
AEB 111	Introductory Zoology	4
GST 111	Use of English I	2
GST 112	Philosophy & Logic	2
BMS 111	Elementary Mathematics 1	2
<b>TOTAL:</b>		<b>25</b>
<b>SECOND SEMESTER</b>		
CHM 122	General Chemistry II	3
CHM 124	Organic Chemistry II	3
PHY 109	Practical Physics	2
PHY 124	Electromagnetic & Modern Physics	4
PBB 122	Plant form & Function	3
AEB 122	Functional Zoology	4
GST 121	Use of English II	2
GST 122	Nigerian People & Culture	2
GST 123	History & Philosophy of Science	2
	<b>TOTAL</b>	<b>25</b>

All Course Are Core At This Level

**Total Session 50**

**DESCRIPTION OF FIRST YEAR COURSES FOR FIRST DEGREE PROGRAMMES.**

**100 LEVEL COURSES:**

**PBB 111 DIVERSITY OF PLANTS (3 Credits)**

Morphology and life circle of plant and animals. A general study of plant and animal groups from virus, algae/fungi to chordates. Structural and functional study of plants and animal cells, tissues, organs and systems. Taxonomic, physiological and developmental studies of plant and animals. Reproduction, genetic, hereditary substances, mechanism of nuclear division and stem cell formation. Evolution and natural selection. Biology practical and demonstrations.

**AEB 111: INTRODUCTION TO ANIMAL AND ENVIRONMENTAL BIOLOGY (4 Credits)**

Man population growth and impact on the biosphere. Faunal biodiversity. Invertebrate – protozoa, coelenterate, platyhelminthes, annelida, Mollusca, Arthropoda. Vertebrata – Cephalochordata, pisces, amphibian, reptilia, aves, mammalia. Mammalian anatomy: anatomy of rattus rattus.

**PHY 111 MECHANICS, THERMAL PHYSICS AND PROPERTIES OF MATTER (3 Credits)**

Dimensional analysis. Element of statistics. Vector algebra, kinematics and dynamics of a mass point. Elementary mechanics and gravitation. Kepler's laws. Motion of rigid bodies, moment of inertia, angular momentum. Conservation of laws. Simple harmonic motion. Elastic properties of solids, module of elasticity. Fluid dynamics and hydrodynamics. Laws of thermodynamics and thermal energy, temperature, calorimetry, change of State, critical points. Heat transfer, conduction, convection and radiation. Black body radiation. Gas laws. Kinetic theory of gases. Physics practical and demonstrations.

**PHY 113 VIBRATIONS, WAVES AND OPTICS (3 Credits)**

Electrostatics, Coulomb's laws Gauss' law and simple application. Electric field energy and electrostatic potentials. Capacitance, Conductors insulators, dielectrics and polarization. Electric current. Ohm's law. Circuit analysis. Thermo electricity. Magnetic effects of currents. Ampere's law application. Magnetism. Earth's magnetic field. Faraday's law of induction. Alternating current. AC circuits—measuring devices. Hall's effect. Optics – basic principle and applications. Eye, Lenses and glasses as applied to common eye defects. Physics practical and demonstration.

### **CHM 111 GENERAL CHEMISTRY 1 (3 Credits)**

An introduction to atomic structure and electronic configuration of the elements. Electronic theory of valency. The periodic classification and the general study of the elements with emphasis on similarities and differences based on position in the periodic table. Radioactivity and its application kinetic theory and laws of gases. Properties of dilute solutions. Thermo-chemistry. Chemical equilibrium. Theory of acids, bases and indicators. Phase equilibrium study and multicomponent systems and application in partition and absorption chromatography. Chemistry practical and demonstration.

### **CHM 113 ORGANIC CHEMISTRY I (3 Credits)**

Introduction to organic chemistry. IUPAC nomenclature, elemental analysis and molecular formulae. Structural isomerism. Isolation and purification methods. The concept of functional groups, resonance and aromaticity. A study of saturated and unsaturated hydrocarbons, cyclic hydrocarbons, alcohols, aldehydes, ketones, aldehydes, comparison of phenols, aldehydes and aromatic amines with their aliphatic analogues. Common synthetic polymers and their uses. Introduction to carbohydrates, proteins, oils, and fats. Optical isomerism. Chemistry practical and demonstration.

### **BMS 111 ELEMENTARY MATHEMATICS 1 (2 Credits)**

Polynomials and their factorization, rational function. Trigonometry definitions and elementary properties of trigonometric function,

radian measure, periodicity of identities. Formulas for sum, product and quotient. The chain rule. Differentiation of definite and indefinite algebraic, trigonometric, exponential and logarithmic functions maxima and minima, tangential and normal. Fundamental theory of calculus, simple application to areas and volumes, Methods of integration.

### **GST 111 USE OF ENGLISH 1 (2 Credits)**

Modes and methods of effective communication in English. Use of literary works to improve communication skills. Development of reading and writing skills. Note taking and summarizing from oral English and written instructions on lexis. Collection for written assignments.

### **GST 112 PHILOSOPHY AND LOGIC (2 Credits)**

Introduction to the main branches of philosophy, symbolic logic. Special symbol in symbolic logic. Conjugation, negation, affirmation, disjunction, equivalence and conditional statements. Law of thought. Method of deduction using rules of inference and biconditional qualification theory.

### **CHM 122 GENERAL CHEMISTRY II (3 Credits)**

Acids, Bases and salts. Quantitative and qualitative analysis. Theory of volumetric analysis—operations and methods. Calculations: mole, molarity, molality. Behavior of electrolytes. Water. Colligative properties. Ostwald's dilution law. Arrhenius, Bronsted-Lowry, Lewis concepts and applications. Buffers – introduction to reaction rates. Equilibria and equilibrium constants. Solubility products. Common effects. Precipitation reactions, Chemistry of Redox reactions.

### **CHM 124 ORGANIC CHEMISTRY II (3 Credits)**

Polar function group chemistry. Hydroxyl group carbonyl group, carboxylic group Carboxylic acid derivatives and amino acids.

Miscellaneous topics – fats and oils, amino acids, proteins, carbohydrates and natural products.

**PHY 109 PRACTICAL PHYSICS (2 Credits)**

Students are expected to carry out a minimum of 12 major experiments covering the main aspects of the courses taken in the year.

**PHY 124 ELECTROMAGNETIC AND MODERN PHYSICS (4 Credits)**

Electromagnetism – electric field, steady direct current, Kirchhoffs laws, capacitors, Eletromagnetic fields, alternating currents, magnetic fields Electromagnetic induction, and electricity and matter. Modern physics – structure of atom and structure of the nucleus.

**BOT 122 PLANT FORM AND FUNCTION (3 Credits)**

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

**AEB 122 FUNCTIONAL ZOOLOGY (4 Credits)**

Embryology–gametogenesis, fertilization and cleavage as demonstrated by Amphioxus, Genetics: the cell and distribution of genetic material, mitosis, meiosis, meiosis inheritance, sex determination and sex linked inheritance. Histology. Cells, tissues, organ formation and main features. Physiology: functioning of mammalian skin, muscles/skeleton, alimentary system/nutritional requirements and deficiencies.

**GST 121 USE OF ENGLISH II (2 Credits)**

**GST 122 NIGERIAN PEOPLE AND CULTURE (2 Credits)**

History, norms and cultural characteristics of African and the Nigerian society in particular, role of culture in the behaviors of

Nigerian. The African society, development, migration, large and small rural movements and its effect on man and disease, the Nigerian rural and urban societies and diseases. Changing patterns of diseases in rural and urban societies. Changing moral values. Cultural nationalism and political evolution of African states. concepts of religion in humanistic functions. Role and concepts of functional education in national development.

**GST 123 HISTORY AND PHILOSOPHY OF SCIENCE (2 Credits)**

**GENERAL INFORMATION**

The science of Anatomy is the study of the form and structure of the living body and the organs, which form it. It also entails the regulations of these structures in relation to their functions and external environment. The science of human anatomy forms the foundation of the science of medicine and other human biological studies. It is a field of study, which is still dependent on technique, and a corpus of observations but it is capable of correlation with other fields of study in the science of medicine and human biology.

**COURSE CODE, COURSE TITLE AND COURSE CREDIT**

**200 LEVEL COURSES**

**FIRST SEMESTER**

Course Code	Course Description	Course Credit
ANT 210	General Anatomy and Gross Anatomy the of upper limbs.	2
ANT 211	Gross Anatomy of Thorax	2
ANT 212	Basic Histology & Cytology	2
ANT 213	General Embryology	2
MBC210	Introductory Biochemistry	2
MBC211	Introductory Analytical techniques	2
PHS 211	Introductory and General Physiology	2
PHS 212	Blood and Body fluid Physiology	2
PHS 213	Cardiovascular System	2
PHS 214	Respiratory Physiology	2
<b>TOTAL</b>		<b>20</b>

**SECOND SEMESTER**

Course Code	Course Description	Course Credit
ANT 220	Gross Anatomy of the Abdomen, Pelvis and Perineum.	2
ANT 222	Gross Anatomy of Lower Limbs	2
ANT 223	Systemic Histology 1	3
MBC 220	Systemic Embryology 1	3
MBC 220	Carbohydrate & Lipid Metabolism	3
MBC 223	Amino acid & Protein Metabolism	3
MBC 225	Protein Chemistry & Enzymology	3
PHS 221	Renal Physiology.	2
PHS 222	Gastrointestinal Physiology	3
PHS 223	Endocrinology & Reproduction	2
PHS 224	Temperature Regulation.	1
<b>TOTAL</b>		<b>27</b>

**TOTAL CREDIT FOR THE YEAR.....47**

**Notes:**

1. The Gross Anatomy lectures are associated with the dissection of the relevant regions.
2. ALL COURSES ARE CORE

**300 LEVEL COURSES**

**FIRST SEMESTER**

ANT 311	Gross Anatomy of Head & Neck	3
ANT 312	Systemic Histology II	3
ANT 313	Systemic Embryology II	3
ANT 314	Neuroanatomy I	2
PHS 313	Autonomic and Neurophysiology	2
PHS 312	Hypothalamo-Hypophyseal System Physiology	2
CED 300	Introduction to Theory and practice of entrepreneurship	2
BOT 315	Biostatistics	2

	<b>TOTAL</b>	<b>19</b>
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**SECOND SEMESTER**

ANT 320	Instrumentation	2
ANT 321	Functional Anatomy of Limbs	2
ANT 322	Relevant Laboratory Techniques	3
ANT 323	History of Anatomy & Medical Genetics	3
ANT 324	Gross Anatomy of Cranial nerves and autonomic nervous system	2
ANT 325	Neuroanatomy II	2
PCO 320	Introductory Pharmacology	2
MMB 321	Introductory Microbiology	1
MBC 320	Clinical Biochemistry	2
	<b>TOTAL</b>	<b>19</b>

**TOTAL CREDIT FOR THE YEAR 38 credit**

**400 LEVEL COURSES**

**FIRST SEMESTER**

ANT 411	Gross Anatomy (Prosection) I	6
ANT 412	Cell Biology I	3
ANT 413	Histochemistry & Cytochemistry	3
ANT 414	Functional Anatomy of Thorax & Abdomen	3
<b>TOTAL</b>		<b>15</b>

**SECOND SEMESTER**

ANT 421	Gross Anatomy (Prosection) II	4
ANT 422	Systemic Embryology III - Review	3
ANT 423	Cell Biology II	3
ANT 424	Systemic Histology III	3
ANT 425	Research Project & Viva	6

ANT 426	Seminar presentation	2
	TOTAL	21

**TOTAL CREDIT FOR THE YEAR 36**

**A SUMMARY OF THE LOAD FOR THE PROGRAMME**

LEVEL	100	200	300	400	TOTAL
CREDITS	50	47	38	36	171

**COURSE DESCRIPTION**

**200 LEVEL**

**FIRST SEMESTER**

**MBC 210: INTRODUCTORY BIOCHEMISTRY.(2 Credits)**

Short history and Definition of Biochemistry. Importance of Biochemistry to medicine and other scientific disciplines. The living cell. Organization and Molecular architecture. Types of cells and their characteristics. Structure and organization of Biological membranes. Biomolecules and the origin of life. Chemistry of Biomolecules. Carbohydrates Classification, structure, distribution and functional role of named examples. Chemical properties and reactions. Essential fatty acids, Eicosanoids, fat-soluble vitamins – Structure and functions. Peptide bonds and hierarchy of protein structure Nucleic acids. RNA and DNA. Structure/function of enzymes. Zymogens Active site and specificity of enzymes. Inhibition and Activation of enzymes. Factors affecting enzyme catalyses reaction. Allosteric enzymes. Isoenzymes. The Concepts of Aviaminoses, Hypovitaaminoses and Antivitamins. Vitamins and their Co-enzyme function. Biomedical importance of vitamins.

**MBC 211: INTRODUCTORY ANALYTICAL TECHNIQUES.**

(2 Credits)

Measuring techniques in cell fractionation, Chromatography, Spectrophotometry, Electrophoresis and Calorimetry. Methods of studying the cell. Microscopy, histochemistry and cytochemistry. Autoradiography Vs. Scintillation counting. Cell fractionation methods including differential Centrifugation and Gradient centrifugation. Molecular hybridization including Paul Doty

experiments. Acids, and bases. Buffers and buffer systems. Henderson Hassel bach equation. Titration curves of acids and bases. End point indicators. zwitterions. isoelectric pH nucleic acid.

**ANT 210: GENERAL ANATOMY AND GROSS ANATOMY OF THE UPPER LIMBS (3 Credits)**

The general descriptive terms as used in the study of the human body would be introduced. The techniques used to study the human body would also be introduced. The normal anatomical position and directional movement of body parts would be introduced.

The gross anatomy of the upper limbs: pectoral region, Axilla, Brachial plexus, scapular region, brachium, carpal tunnel, Hand, Nerve injuries, oseteo-logy and joint of the upper limb, the vascular anastomosis and lymphatic drainage of the breast and upper limb would be studied.

**ANT 211: GROSS ANATOMY OF THORAX (2 Credits)**

Description: of the thorax: The sternum and ribs, thoracic vertebrae, Heart and great vessels, thoracic duct, dissection of the entire thoracic region, Azygos system of vein, intercostal spaces, Mediastinum, lungs bronchiopulmonary tree and segments, thoracic diaphragm, Aorta and respiratory movement.

**ANT 212: BASIC HISTOLOGY AND CYTOLOGY (2 Credits)**

Description: Structure and the function of the cell, general histology basic tissues of the body. Preparation of tissues for microscopy is a practical oriented course that is studied along side with the theoretically based lecture.

**ANT 213: GENERAL EMBRYOLOGY (2 Credits)**

Gametogenesis, fertilization, implantation, cleavage, the morula, the blastocyst formation of the primitive streak, the Bilaminar and trilaminar germ disc. Development of tissues and organ systems of the embryo, the chorionic and amniotic cavities, foetal membranes, placental formation and functions. Birth defects,

chromosomal and factors. Twins and twin defects, general characteristics of the embryonic environment and foetal periods.

**PHS 211: INTRODUCTORY AND GENERAL PHYSIOLOGY**  
(2 Credits)

Cell physiology, Physiochemical principles, Body fluids and Blood transport: Control systems. Introduction to ANS. Excitable and contractile Cells.

**PHS 212: BLOOD AND BODY FLUID PHYSIOLOGY** (2 Credits)

Introduction and definition of body fluids and body fluid compartments. Regulation of body fluid volumes Physiological variation of body fluid volumes. Techniques for quantifying various body fluid volumes.

Blood: Functions of blood and classifications of blood cells. Erythropoiesis. Haematological indices. Haemoglobin genotype and Blood groups. Immunology and cell defence.

**PHS 213: CARDIOVASCULAR SYSTEM** (2 Credits)

Definition and functions of the cardiovascular system, Cardiac muscle Cardiac myoelectrophysiology, cardiac cycle, Circulation of blood: cardiac output and regulation. Blood pressure. Haemodynamics and microcirculation. Pulmonary, Cerebral, Coronary, Splanchnic and muscle circulation, Shock and cardiovascular changes in exercise.

**PHS 214: RESPIRATORY SYSTEM** (2 Credits)

Definition and functions of the respiratory system, Physiologic anatomy of the respiratory system. Respiratory dynamics and work. Pulmonary ventilation: Lung volumes and capacities, spirometry. Mechanism and mechanics of breathing, Lung surfactant, pulmonary circulation. Gas exchange and Gas transport. Oxygen Haemoglobin dissociation curve. Hypoxia and Dyspnoea. Respiratory changes in exercise and barometric changes. Control of breathing.

**SECOND SEMESTER**

**ANT 220: GROSS ANATOMY OF THE ABDOMEN, PELVIS AND PERINEUM** (2 Credits)

Abdomen: subdivision of the abdominal region and their applied anatomy, Anterior Abdominal wall, inguinal region, posterior abdominal wall, stomach, spleen, liver, gall bladder, pancreas, small and large intestine, celiac trunk, biliary apparatus, intra and supra colic compartment and recesses, appendix renal and suprarenal gland, dissection of the entire abdominal region for proper understanding of the entire region.

Pelvis & perineum: pelvic cavity wall and diaphragm. Urinary bladder, uterus, ovary, etc). Perineum, boundaries and subdivisions. Perineal pouches, external and internal genitalia, ischiorectal fossas. General dissection of the pelvis and perineal region.

**ANT 221: GROSS ANATOMY OF THE LOWER LIMBS**  
(2 Credits)

The lower limb lumbar and lumbosacral plexus, femoral triangle, thigh, gluteal region, leg, foot, nerves injury and their applied anatomy. Popliteal fossa, Ankle joints, Arch of the foot, Osteology and joints of the lower limb. Vascular Anastomosis and lymphatic drainage of the lower limb. The theoretical aspect to go along side with the dissection of these regions in cadaver.

**ANT 222: SYSTEMIC HISTOLOGY 1** (3 Credits)

Systemic histology of CVS, GIT, musculoskeletal.

**ANT 223: SYSTEMIC EMBRYOLOGY 1** (3 Credits)

The diaphragm, the cardiovascular, respiratory and gastro intestines systems. Development of the adrenal gland, the liver, the pancreas and the spleen. The urogenital, musculo-skeletal and integumentary system. The limbs, the molecular regulation and associated developmental anomalies of the systems.

**PHS 221: RENAL PHYSIOLOGY (2 Credits).**

Definition and functions of the kidney. Physiologic anatomy of the kidney. Glomerular filtration. Tubular functions. Urine formation:- Dilute and concentrated Urine, Counter current mechanism, Plasma clearance, renal autoregulation, ECF regulation, Acid Base balance, Renin-Angiotensin system.

**PHS 222: GASTROINTESTINAL PHYSIOLOGY (3 Credits)**

Definition and functions, Physiologic anatomy and Innervations of the GIT, Mastication, Deglutition, Salivary gland, Digestion and food absorption, Movement and Stomach emptying, Movements of the GIT, Vomiting and defecation, GIT secretions and juices, Liver and General metabolism (BMR)

**PHS 223: ENDOCRINOLOGY AND REPRODUCTION**

(2 Credits)

Definition and functions, Definition of Hormones, Methods of Measurement, Types and mechanism of Actions, Regulation, Physiologic anatomy, Hypothalamus-Hypothalamic releasing factors, Hypothalamic Nuclei, Hypothalamo-hypophyseal system, Pituitary gland, Tropic Hormones, GIT and other local hormones.

Structure and functions of male and female reproductive organs, Androgens, Spermatogenesis and fertility. Infertility in male. Monogenesis, Sexual cycle and hormonal regulations. Fertilization, Pregnancy and Parturition, Fertility and infertility in female. Family planning

**PHS 224: TEMPERATURE REGULATION (1 Credit)**

Body temperature and the environment, Mechanisms of heat Exchange, peripheral thermoreceptors, central thermoreceptors, hyperthermia, and hypothermia, Fever, heat Exhaustion and Heat stroke

**MBC 220: CARBOHYDRATE AND LIPID METABOLISM (3 Credits).**

Structural inter-relationships of sugars. Stereochemistry of sugars. Hexoses, Pentoses, Disaccharides, Starch, Glycogen, and Polysaccharides. Methods of identifying sugars. Carbohydrate

metabolism. Digestion and absorption. Glycolysis. TCA Cycle and Pentose Phosphate pathway. Control of Glycolysis. TCA Cycle and Pentose Phosphate pathway. Glyoxylate Pathway. Gluconeogenesis. Glyoxylate Pathway. Gluconeogenesis. Glycogenolysis and Glycogenesis. Mitochondrial electron transport chain and Oxidative Phosphorylation. Energy generation and storage in Biological systems.

Disorders of Carbohydrate Metabolism. The pyruvate and  $\alpha$  - Ketoglutarate complexes and their regulation. Metabolism of lipids. Digestion and absorption. Role of Lipoproteins in lipid transport. Metabolism of lipoprotein in health and disease. Triacylglycerol oxidation and oxidation of fatty acids. Storage and mobilization of energy stores in adipocytes. Ketone bodies and Ketosis.

Interrelationship of fatty acid and carbohydrate biosynthesis/oxidation. Biological importance of Eicosanoids. glycolipids and sphingolipids. . The Chemistry and metabolism of Steroids and Steroid hormones

**MBC 223: AMINO ACID AND PROTEIN METABOLISM**

(3 Credits).

Structure of amino acids. Peptide bonds. Metabolism and transport of amino acids and proteins. Digestion and absorption. Gammaglutamyl cycle. Detailed treatment of mechanism of deamination, transamination glutamate dehydrogenase, glutamate and glutamine synthesis. The biochemical and clinical importance of these enzymes. Fate of Carbon skeleton. Urea cycle. The concepts of nitrogen balance. Nitrogen turnover in cells. Degradation of amino acids. Ketogenic and glucogenic amino acids. Aromatic acid degradation and inborn errors of metabolism, metabolism of uric acid Integration and Compartmentation in intermediary metabolism. Metabolism of one carbon compounds.

**MBC 225: PROTEIN CHEMISTRY AND ENZYMOLOGY (3 Credits).**

A review of the Structural Characteristic of proteins. Determination of N and C terminal amino acid. Amino acid sequence and sulphide bridges. Determination of Protein Structure by X- Crystallography. biological functions of proteins. The oxygen transporting proteins (haemoglobin and myoglobin) connective tissue protein. Collagen and elastin. Structure /function relationships.

Enzymes. Isolation and Purification from animals and plants. And Microorganism. Zymogens and Isoenzymes. Characteristics of Enzymes. Kinetics of enzyme catalysed reaction. Allosterism. Importance of enzymology in Medicine. Coenzymes and relationships to vitam

**300 LEVEL**

**FIRST SEMESTER**

**ANT 311: GROSS ANATOMY OF HEAD AND NECK (3 Credits).**

Skull, scalp and the face. Side of the Neck cervical fascia, posterior and anterior triangle of the neck, back of the Neck, cranial cavities, temporal and infratemporal regions, parotid region, submandibular region, deep structures of the neck, thyroid and parathyroid glands, oral cavity, pharynx and larynx, nasal cavity, Ear and orbit (eye).

**ANT 312: SYSTEMIC HISTOLOGY II (3 Credits)**

Microscopic anatomy of the brain and spinal cord. Microscopic history of the lungs, trachea, bronchus and alveoli.

**ANT 313: SYSTEMIC EMBRYOLOGY II (3 Credits)**

Embryology of the respiratory system. Development of the face, the palate, the sinuses, the thyroid, pituitary and pineal glands. The teeth, development of the central and peripheral nervous systems. Development of the eye and ear. The molecular regulation and associated developmental anomalies of the organs and systems.

**ANT 314: NEUROANATOMY I (2 Credits)**

40

Coverings of the brain and spinal cord. Forebrain, midbrain and hindbrain. Ventricular systems, production and flow of cerebrospinal fluid (CSF), Ascending and descending tracts in the brain and spinal cord, External and internal structures of brain and spinal cord, structures and pathways in the brainstem and spinal cord.

**BOT 315 BIOSTATISTICS (2 credits)**

Population and Samples, probability distribution, Normal poison and Binomial distribution, Mean standard error standard deviation, Cub fitting, CHI-TEST. Student test f-distribution, Regression, correlation. Role of macro and micronutrient elements, iron deficiency symptoms. (2 lectures, /practical per week

**CED 300 – INTRO. TO THEORY AND PRACTICE OF ENTREPRENEURSHIP.**

You as an Entrepreneur, Getting started. Selecting the legal forms of business. Discovering Business Opportunities. The legal framework for the Entrepreneur. Government policies and Entrepreneurial activities, Ethical Issues in business, financing a new venture. Sources marketing your product and services Employing people, Establishing and maintaining Accounting Records.

**SECOND SEMESTER**

**ANT 321: FUNCTIONAL ANATOMY OF LIMBS (2 Credits)** Clinical application of knowledge of gross anatomy of the limbs as studied by dissection of cadaver to clinical medicine. Anatomy of common surgical exposure, outline clinical procedures associated with the limbs.

**ANT 322: RELEVANT LABORATORY TECHNIQUES (3 Credits).**

It comprises of laboratory sections and lecture on histological techniques, fixation and staining techniques, photo microscopy, tissue preparation and embalming techniques.

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**ANT 323: HISTORY OF ANATOMY AND MEDICAL GENETICS**

(3 Credits)

Brief and basic history of Anatomy. Men that has contributed to the development of anatomy (herophilus, erasistratus, leanardo Da Vinci, Andrea Vesalius, William Harvey, fabricus, Galen etc) and their contributions. Introduction to medical genetics, Heritable and non-heritable characteristics, Patterns of inheritance. Human Chromosomas, Cytogenetic and karyotyping.

**ANT 324: GROSS ANATOMY OF CRANIAL NERVES AND AUTONOMIC NERVOUS SYSTEM (2 Credits)**

It deals with the proper study of the twelve cranial nerves. Their Nuclei of origin, course, distribution and clinical importance of these cranial nervous. The visceral nervous system will be considered. Detail of the sympathetic and parasympathetic nervous system based on their origin, course, distribution and their anatomical, physiological, and pharmacological differences will also be studied.

**ANT 325:NEUROANATOMY II (2credits)**

A more detailed study of the coverings of the brain and spinal cord. Forebrain, midbrain and hindbrain. Ventricular systems, production and flow of cerebrospinal fluid (CSF), Ascending and descending tracts in the brain and spinal cord, External and internal structures of brain and spinal cord, structures and pathways in the brainstem and spinal cord.

**PCO 320: INTRODUCTORY PHARMACOLOGY (2 Credits).**

History of Pharmacology and its development. Introduction to pharmacokinetics; drug absorption and bioavailability. Drug metabolism, pharmacogenetics. Effects of disease on drug kinetics. Drug in pregnancy and the extreme age. Pharmacodynamics; dose-response relationships, LD<sub>50</sub> ED<sub>50</sub> and TD<sub>50</sub>. Therapeutic index; introduction of new drugs, clinical trials; adverse drug reactions and adverse reaction surveillance.

42

**400 LEVEL****FIRST SEMESTER****ANT 411: GROSS ANATOMY I (6 Credits)**

A general over view of the upper limb, lower: Limb, thorax, abdomen, pelvis and perineal regions in both theoretical and practical demonstration by every student in this level.

**ANT 412: CELL BIOLOGY I (3 Credits)** Practical and theoretical oriented course on the cell, tissue, organ and systemic cell biology will be studied. Mechanism and current evolutionary trend comparative anatomy and choice of experimental animal will also be considered.

**ANT 413: HISTOCHEMISTRY AND CYTOCHEMISTRY (3 Credits)**

Cytochemical and histochemical background and its importance. Basic equipment and techniques used in carbohydrate, protein & lipids histochemistry, pigments histochemistry, Enzyme histochemistry and procedures employed. Immunohistochemistry.

**ANT 414: FUNCTIONAL ANATOMY OF THORAX AND ABDOMEN**

(3 Credits)

Clinical Anatomy of the thoracic and abdominal regions. This include the surface anatomy of all the visceral and their clinical importance to medicine will be studied.

**SECOND SEMESTER****ANT 421: GROSS ANATOMY II (4 Credits)**

General overview of the thoracic and abdominal regions. This include the surface anatomy of all the visceral, and their clinical importance to medicine will be reviewed.

**ANT 422: SYSTEMIC EMBRYOLOGY III – REVIEW (3 Credits)**

The development and associated anomalies with the body system will be reviewed.

**ANT 423: CELL BIOLOGY II (3 Credits)**

43

Histological techniques and relevant of systemic cell biology. Teratology and their applied anatomy to human existence. General cell biology will be reviewed.

**ANT 424: SYSTEMIC HISTOLOGY III (3 Credits)**

Preparation of slides, preservation, and embalment of dead bodies, photomicrography, prosectomy, etc.

**ANT 425: RESEARCH PROJECT AND VIVA (6 Credits)**

A Simple research project will be carried out by the students in their area of interest under supervision by an Academic staff approved by the Department of Anatomy.

**ANT 426: RESEARCH SEMINAR AND PRESENTATION (2 Credits).**

**DEPARTMENT OF MEDICAL BIOCHEMISTRY  
B.Sc. DEGREE PROGRAMME  
STAFF OF DEPARTMENT OF MEDICAL BIOCHEMISTRY.**

S/NO.	NAME	QUALIFICATIONS.	RANK
1	OBOH H. A. (DR.) (MRS.)	B.Sc, M.Sc, Ph.D	ASSOC. PROF.
2	ERHUNWUNSE R. U. (DR.)	FIBMS, M.Sc, Ph.D	SENIOR LECTURER
3	OMONKHUA A. A. (DR.)	B.Sc, M.Sc, Ph.D	SENIOR LECTURER /HOD
4	OLUMESE F. E. (DR.)	B.Sc, MBBS, M.Sc	LECTURER I
5	ANIONYE J. C. (DR.)	B.Sc, MBBS, M.Sc	LECTURER I
6	OMOROWA E. F. (DR.)	B.Sc, MBBS, M.Sc	LECTURER I
7	EDOSA R. O. (DR.)	B.Sc, MBBS	LECTURER II
8	AGUEBOR-OGIE N. B. (MR.)	B.Sc, M.Sc	LECTURER II
9	OGHAGBON E. S. (DR.)	BMLS, MBBS	LECTURER II
10	ORIAKHI K. (MR.)	B.Sc, M.Sc	ASST. LECTURER
11	AGU K. C. (MR.)	B.Sc, M.Sc	ASST. LECTURER
12	*ANOLIEFO O. N. (MISS)	B.Sc, M.Sc	ASST. LECTURER
13	EZEUGWU N. (MISS)	B.Sc, M.Sc	ASST. LECTURER
14	OSAGIE A. O. (MR.)	B.Sc, M.Sc	ASST. LECTURER
15	AGUEBOR O. (MISS)	B.Sc	GRADUATE ASST.
16	OBASOYEN MERIT E. (MISS)	B.Sc	GRADUATE ASST.

#### TECHNICAL STAFF

S/NO.	NAME	QUALIFICATIONS.	RANK
1	EIYA B. (MRS.)	AIMLS, FIMLS, M.Sc	PRIN. MED. LAB. SCIENTIST
2	OMO-ERHABOR J. A. A. (MR.)	BMLS, AMLSCN, PGDE	MED. LAB. SCIENTIST II
3	OSAYANDE P. (MISS.)	SSCE	LAB. ASSISTANT

#### ADMINISTRATIVE STAFF

S/NO.	NAME	QUALIFICATIONS.	RANK
1	IJEWEMEN BEAUTY A. (MISS)	B.Sc (Ekpoma), DIL (UNIBEN)	ADMINSTRATIVE ASST.
2	EGUAE E. JUSTINA (MRS)	HND (Auchi), PGDPA (UNIBEN)	HIGHER EXECUTIVE OFFICER
3	UHUMWANGHO V. O. (MRS.)	B.Sc Accounting, Dip Comp Sc (UNIBEN)	CONF. SECRETARY I
4	OBASOGIE IKPONWOSA (MISS)	B.Sc, DPA (UNIBEN)	EXECUTIVE OFFICER
5	OSULA J. (MRS.)	NECO	OFFICE ASST.
6	OSAMOR J. R. (MR.)	Primary 6	OFFICE ASST. II

#### GENERAL INFORMATION

Biochemistry is that biological science that enquires into the chemical constitution of living things and the reaction that takes place in the cell. It deals with the role of chemical processes in the maintenance of the constancy of the whole organism. It furnishes the basic knowledge necessary for work in both molecular and the cellular aspects of modern Biology. Medical Biochemistry therefore tries to understand and solve health problems with the tools of modern Biochemistry.

#### PHILOSOPHY, OBJECTIVES AND SCOPE

The Bachelor (B. Sc.) programme in Medical Biochemistry will aim at producing graduates who are well equipped with knowledge to help him/her tackle health problems of Nigeria and Africa as a whole, through research. Therefore emphasis will be laid on locally important topics so as to advance the well being of people in the West African sub-region. Graduates of the programme will be well equipped with sufficient theoretical and practical knowledge and thus eligible for higher degree studies in any aspect of Medical Biochemistry and its related discipline.

#### DEGREE PROGRAMME AND REQUIREMENTS

The degree programme will last three years for direct entry students and four years for students admitted through JAMB. To be eligible for admission to a degree of B. Sc. in Medical Biochemistry, a candidate should have

- Satisfied the normal University requirements.
- Satisfied the approved school of basic medical science requirements in respect of work load, registration for courses and programme duration.
- Satisfied the departmental requirements as contained below.

#### FOUR-YEAR DEGREE PROGRAMME

**100 LEVEL COURSES:** AS DESCRIBED ABOVE (Page 11 - 15.)

#### COURSE CODE, COURSE TITLE AND COURSE CREDIT

#### 200 LEVEL COURSES: FIRST SEMESTER

Course Code	Course Description	Course Credit
ANT 210	General Anatomy and Gross Anatomy of the upper Limbs.	2
ANT 211	Gross Anatomy of Thorax	2
ANT 212	Basic Histology & Cytology	2
ANT 213	General Embryology	2
MBC 210	Introductory Biochemistry	2
MBC 211	Introductory Analytical Techniques	2
PHS 211	Introductory and General Physiology	2

PHS 212	Blood and Body fluid Physiology	2
PHS 213	Cardiovascular System	2
PHS 214	Respiratory Physiology	2
<b>TOTAL</b>		<b>20</b>

**SECOND SEMESTER**

Course Code	Course Description	Course Credit
ANT 220	Gross Anatomy of the Abdomen, Pelvis and Perineum	2
ANT 221	Gross Anatomy of the Lower Limbs	2
ANT 222	Systemic Histology I	3
ANT 223	Systemic Embryology I	3
MBC 220	Carbohydrate & Lipid Metabolism	3
MBC 223	Amino acid & Protein Metabolism	3
MBC 225	Protein Chemistry & Enzymology	3
PHS 221	Renal Physiology.	2
PHS 222	Gastrointestinal Physiology	3
PHS 223	Endocrinology & Reproduction	2
PHS 224	Temperature Regulation.	1
<b>TOTAL</b>		<b>27</b>

**TOTAL CREDIT FOR THE YEAR.....47**

All courses are **CORE**

Notes: 1. ALL COURSES ARE CORE.

**300 LEVEL COURSES**

**FIRST SEMESTER**

Course Code	Course Description	Course Credit
*MBC 301	Nutrition & Dietetics	2
*MBC 311	Immunology & Immunochemistry	3
*MBC 312	Intermediary Metabolism	2
*MBC 313	Bioenergetics	2
*CED 300	Introduction to Theory and	2

	practice of entrepreneurship	
	<b>TOTAL</b>	<b>11</b>

**SECOND SEMESTER**

Course Code	Course Description	Course Credit
*MBC 320	Clinical Biochemistry	3
*MBC 321	Microbial Physiology & Biochemistry.	3
*MBC 322	Introductory Molecular Biology	3
*MBC 325	Techniques in Biochemical Research	2
*MBC 327	Students Industrial Work Experience Scheme (SIWES)	2
*MBC 329	Introduction to Biochemical Literature	2
+PHS 321	Animal Experiment & Design of Experiment	2
+BOT 315	Biostatistics	2
+MMB 321	Introductory Microbiology	1
+PCO 320	Introductory Pharmacology	2
	<b>TOTAL</b>	<b>22</b>

\*Core courses + mandatory courses e – elective courses.

**TOTAL CREDIT FOR THE YEAR.....33**

**400 LEVEL COURSES.**

**FIRST SEMESTER**

Course Code	Course Description	Course Credit
*MBC 410	Regulatory Mechanisms	2
*MBC 411	Advanced Enzymology	3
*MBC 412	Tissue Biochemistry	3
eMBC 413	Biochemistry of Medicinal Plants	2
eMBC 414	Nutrition & food Science	3
+MBC 415	Biochemistry of Hormones	2

+MBC 417	Biomembranes	2
+MBC 418	Seminar	2
<b>TOTAL</b>		<b>19</b>

**SECOND SEMESTER**

Course Code	Course Description	Course Credit
*MBC 420	Clinical & forensic Biochemistry	3
*MBC 421	Biochemical Pharmacology	2
*MBC 422	Advanced Molecular Biochemistry	3
eMBC 423	Inorganic Biochemistry	2
+MBC 425	Introduction to Biotechnology	2
eMBC 426	Biochemistry of Parasites & Viruses	3
*MBC 499	Project	6
<b>TOTAL</b>		<b>21</b>

**TOTAL CREDIT FOR THE YEAR.....40**

- \* = Core Course
- + = Mandatory
- e = Elective

**A SUMMARY OF THE CREDIT LOAD FOR THE PROGRAMME**

LEVEL	100	200	300	400	TOTAL
	50	47	30	40	167

**DESCRIPTION OF COURSES**

**200 LEVEL**

**FIRST SEMESTER.**

**MBC 210: INTRODUCTORY BIOCHEMISTRY.(2Credits)**

Short history and Definition of Biochemistry. Importance of Biochemistry to medicine and other scientific disciplines. The living cell. Organization and Molecular architecture. Types of cell and

their characteristics. Structure and organization of Biological membranes. Biomolecules and the origin of life. Chemistry of Biomolecules. Carbohydrates Classification, structure distribution and functional role of named examples. Chemical properties and reactions. Essential fatty acids, Eicosanoids fat-soluble vitamins – Structure and functions. Peptide bonds and hierarchy of protein structure Nucleic acids. RNA and DNA. Structure/function of enzymes. Zymogens Active site and specificity of enzymes. Inhibition and Activation of enzymes. Factors affecting enzyme catalyses reaction. Allosteric enzymes. Isoenzymes. The Concepts of Avitaminoses, Hypovitaminoses and Antivitamins. Vitamins and their Co-enzyme function. Biomedical importance of vitamins.

**MBC 211: INTRODUCTORY ANALYTICAL TECHNIQUES.(2Credits)**

Measuring techniques in cell fractionation, Chromatography, Spectrophotometry, Electrophoresis and Calorimetry. Methods of studying the cell. Microscopy, histochemistry and cytochemistry. Autoradiography vs. Scintillation counting. Cell fractionation methods including differential Centrifugation and Gradient centrifugation. Molecular hybridization including Paul Doty experiments. Acids, and bases. Buffers and buffer systems. Henderson Hassel bach equation. Titration curves of acids and bases. End point indicators. zwitterions. isoelectric pH nucleic acid.

**ANT 210: GENERAL ANATOMY AND GROSS ANATOMY OF THE UPPER LIMBS (2 Credits)**

The general descriptive terms as used in the study of the human body would be introduced. The techniques used to study the human body would also be introduced. The normal anatomical position and directional movement of body parts would be introduced.

The gross anatomy of the upper limbs: pectoral region, Axilla, Brachial plexus, scapular region, brachium, Antebrachial fossa and its Anastomosis, carpal tunnel, Hand, Nerve injuries, osteology and joint of the upper limb, the vascular anastomosis and

lymphatic drainage of the breast and upper limb would be studied.

**ANT 211: GROSS ANATOMY OF THORAX** (2 Credits)

Description: for the thorax: The sternum and ribs, thoracic vertebrae, Heart and great vessels, thoracic duct, dissection of the entire thoracic region, Azygos system of vein, intercostals spaces, Mediastinum, lungs bronchiopulmonary tree and segments thoracic diaphragm, Aorta and respiratory movement.

**ANT 212: BASIC HISTOLOGY AND CYTOLOGY** (2 Credits)

Description: Structure and the function of the cell, general histology and basic tissues of the body. Preparation of tissues for microscopy, is a practical oriented course that is studied along side with the theoretically based lecture.

**ANT 213: GENERAL EMBRYOLOGY** (2 Credits)

General consideration of the male and female Reproductive organs. Gametogenesis, fertilization, implantation, cleavage, the morula, the blastocyst formation of the primitive streak, the Bilaminar and trilaminar germ disc. Development of tissues and organ systems of the embryo, the chorionic and amniotic cavities, foetal membranes, placental formation and functions. The molecular regulation in differentiation of tissues and organs and in the establishment and patterning of the body axis. Birth defects, chromosomal and genetic factors. Twins and twin defects, general characteristics of the embryonic environment and foetal periods.

**PHS 211: INTRODUCTORY AND GENERAL PHYSIOLOGY**  
(2 Credits)

Cell physiology, Physiochemical principles, Body fluids and Blood transport: Control systems. Introduction to ANS. Excitable and contractile Cells.

**PHS 212: BLOOD AND BODY FLUID PHYSIOLOGY** (2 Credits)

Introduction and definition of body fluids and body fluid compartments. Regulation of body fluid volumes Physiological variation of body fluid volumes. Techniques for quantifying various body fluid volumes.

Blood: Functions of blood and classifications of blood cells. Erythropoiesis. Haematological indices. Haemoglobin genotype and Blood groups. Immunology and cell defence.

**PHS 213: CARDIOVASCULAR SYSTEM** (2 Credits)

Definition and functions of the cardiovascular system, Cardiac muscle Cardiac myoelectrophysiology, cardiac cycle, Circulation of blood: cardiac output and regulation. Blood pressure. Haemodynamics and microcirculation. Pulmonary, Cerebral, Coronary, Splanchnic and muscle circulation, Shock and cardiovascular changes in exercise.

**PHS 214: RESPIRATORY SYSTEM** (2 Credits)

Definition and functions of the respiratory system, Physiologic anatomy of the respiratory system. Respiratory dynamics and work. Pulmonary ventilation: Lung volumes and capacities, spirometry. Mechanism and mechanics of breathing, Lung surfactant, pulmonary circulation. Gas exchange and Gas transport. Oxygen Haemoglobin dissociation curve. Hypoxia and Dyspnoea. Respiratory changes in exercise and barometric changes. Control of breathing.

**SECOND SEMESTER**

**ANT 220: GROSS ANATOMY OF THE ABDOMEN, PELVIS AND PERINEUM** (2 Credits)

Abdomen: subdivision of the abdominal region and their applied anatomy, Anterior Abdominal wall, inguinal region, posterior abdominal wall, stomach, spleen, liver, gall bladder, pancreas, small and large intestine, celiac trunk, biliary apparatus, intra and supra colic compartment and recesses, appendix renal and

suprarenal gland, dissection of the entire abdominal region for proper understanding of the entire region.

Pelvis & perineum: pelvic cavity wall and diaphragm. Pelvic visceral like the urinary bladder, uterus, testes, ovary, etc). Perineum, boundaries and subdivisions. Perineal pouches, external and internal genitalia, ischiorectal fossas. General dissection of the pelvis and perineum region.

#### **ANT 221: GROSS ANATOMY OF THE LOWER LIMBS**

(2 Credits)

The lower limb lumbar and lumbosacral plexus, femoral triangle, thigh, gluteal region, leg, foot, nerves injury and their applied anatomy of lower limb popliteal fossa, Genual and ankle joints, Arch of the foot, Osteology and joins of the lower limb. Vascular Anastomosis and lymphatic drainage of the lower limb.

The theoretical aspect to go along side with the dissection of these regions in cadaver.

#### **ANT 222: SYSTEMIC HISTOLOGY I** (3 Credits)

Systemic histology of CVS, GIT, musculo skeletal.

#### **ANT 223: SYSTEMIC EMBRYOLOGY** (3 Credits)

The diaphragm, the cardiovascular, respiratory and gastrointestinal systems. Development of the adrenal gland, the liver, the pancreas and the spleen. The urogenital, musculo-skeletal and integumentary system. The limbs, the molecular regulation and associated developmental anomalies of the systems.

#### **PHS 221: RENAL PHYSIOLOGY** (2 Credits)

Definition and functions of the kidney. Physiologic anatomy of the kidney. Glomerular filtration. Tubular functions. Urine formation:- Dilute and concentrated Urine, Counter current mechanism,

Plasma clearance, renal auto regulation, ECF regulation, Acid Base balance, Renin-Angiotensin system.

#### **PHS 222: GASTROINTESTINAL PHYSIOLOGY** (3 Credits)

Definition and functions, Physiologic anatomy and Innervations of the GIT, Mastication, Deglutition, Salivary gland, Digestion and food absorption, Movement and Stomach emptying, Movements of the GIT, Vomiting and defecation, GIT secretions and juices, Liver and General metabolism (BMR)

#### **PHS 223: ENDOCRINOLOGY AND REPRODUCTION** (2 Credit)

Definition and functions, Definition of Hormones, Methods of Measurement, Types and mechanisms of Action, Regulation, Physiologic anatomy, Hypothalamus-Hypothalamic releasing factors, Hypothalamic Nuclei, Hypothalamo-hypophyseal system, Pituitary gland, Tropic Hormones, GIT and other local hormones.

Structure and functions of male and female reproductive organs, Androgens, Spermatogenesis and fertility. Infertility in male. Oogenesis, Sexual cycle and hormonal regulations. Fertilization, Pregnancy and Parturition, Fertility and infertility in female. Family planning

#### **PHS 224 TEMPERATURE REGULATION** (1 Credit)

Body temperature and the environment, Mechanisms of heat Exchange, peripheral thermoreceptors, central thermoreceptors, hyperthermia, and hypothermia, Fever, heat Exhaustion and Heat stroke.

#### **MBC 220: CARBOHYDRATE AND LIPID METABOLISM** (3 credits)

Structural inter-relationships of sugars. Stereochemistry of sugars. Hexoses, Pentoses, Disaccharides, Starch, Glycogen, and Polysaccharides. Methods of identifying sugars. Carbohydrate metabolism. Digestion and absorption. Glycolysis. TCA Cycle and Pentose Phosphate pathway. Control of Glycolysis. TCA Cycle and Pentose Phosphate pathway. Glyoxylate Pathway.

Gluconeogenesis. Glyoxylate Pathway. Gluconeogenesis. Glycogenolysis and Glycogenesis. Mitochondrial electron transport chain and Oxidative Phosphorylation. Energy generation and storage in Biological systems.

Disorders of Carbohydrate Metabolism. The pyruvate and  $\alpha$  - Ketoglutarate complexes and their regulation. Metabolism of lipids. Digestion and absorption. Role of Lipoproteins in lipid transport. Metabolism of lipoprotein in health and disease. Triacylglycerol oxidation and oxidation of fatty acids. Storage and mobilization of energy stores in adipocytes. Ketone bodies and Ketosis.

Interrelationship of fatty acid and carbohydrate biosynthesis/oxidation. Biological importance of Eicosanoids. glycolipids and sphingolipids. . The Chemistry and metabolism of Steroids and Steroid hormones

**MBC 223: AMINO ACID AND PROTEIN METABOLISM (3 credits)**

Structure of amino acids. Peptide bonds. Metabolism and transport of amino acids and proteins. Digestion and absorption. Gammaglutamyl cycle. Detailed treatment of mechanism of deamination, transamination glutamate dehydrogenase, glutamate and glutamine synthesis. The biochemical and clinical importance of these enzymes. Fate of Carbon skeleton. Urea cycle. The concepts of nitrogen balance. Nitrogen turnover in cells. Degradation of amino acids. Ketogenic and glucogenic amino acids. Aromatic acid degradation and inborn errors of metabolism, metabolism of uric acid Integration and Compartmentation in intermediary metabolism. Metabolism of one carbon compounds.

**MBC 225: PROTEIN CHEMISTRY AND ENZYMOLOGY (3credits)**

A review of the Structural Characteristic of proteins. Determination of N and C terminal amino acid. Amino acid sequence and sulphide bridges. Determination of Protein Structure by X- Crystallography. biological functions of proteins. The oxygen transporting proteins (haemoglobin and myoglobin)

connective tissue protein. Collagen and elastin. Structure /function relationships.

Enzymes. Isolation and Purification from animals and plants. And Microorganism. Zymogens and Isoenzymes. Characteristics of Enzymes. Kinetics of enzyme catalysed reaction. Allosterism. Importance of enzymology in Medicine. Coenzymes and relationships to vitamins.

**300 LEVEL**

**FIRST SEMESTER.**

**MBC 301: NUTRITION AND DIETETICS (2 Credits)**

Nutritional Biochemistry, Principles of nutrition. Food pyramid. Nutritional requirements in a varied populace. Biochemistry of Vitamins and Minerals. Vitamins and minerals in clinical practice. Nutritional disorders and assessments. Nutritional constituents of local foodstuff. The use of local foodstuffs in the management of diseases.

**MBC 311: IMMUNOLOGY & IMMUNOCHEMISTRY (3 Credits)**

Concepts and types of immunity. The immune system. Immune response. Requirements of immunogenicity. Antibody-Antigen reactions. The role of macrophages and polymorphonuclear leucocytes in immune response. Phagocytosis and the immune response. Factors affecting the immune response. Antibody-types, characteristics and structure. J-chain and secretory component. The complement system and its role. Immunological tolerance and autoimmune diseases. Immunological laboratory methods. Hypersensitivity an allergy. Histocompatibility complex (MHC). Hemagglutination and blood group serology. Monoclonal antibodies. Immunopathology.

**BOT 315 BIOSTATISTICS (2 credits)**

Population and Samples, probability distribution, Normal poisson and Binomial distribution, Mean standard error standard deviation, Cub fitting, CHI-TEST. Student test f-distribution, Regression, correlation. Role of macro and micronutrient

elements iron deficiency symptoms. (2 lectures, /practical per week.)

### **CED 300 INTRO. TO THEORY AND PRACTICE OF ENTREPRENEURSHIP**

You as an Entrepreneur, Getting started. Selecting the legal forms of business. Discovering Business Opportunities. The legal framework for the Entrepreneur. Government policies and Entrepreneurial activities, Ethical Issues in business, financing a new venture. Sources marketing your product and services Employing people, Establishing and maintaining Accounting Records. Budgeting for Control.

### **MBC 312: INTERMEDIARY METABOLISM (2 Credits)**

Integration of Metabolism. The provision of metabolic fuels. Metabolic fuels in the fed and starving states. Metabolic interrelationships between adipose tissue, liver, extra hepatic tissues and muscle. The role of hormones in intermediary metabolism. Regulation of metabolism in adipose tissue.

### **MBC 313: BIOENERGETICS (2 Credits)**

Acids and bases. Buffer and buffer systems. Blood buffers first and second laws of thermodynamics. Chemical thermodynamics. Thermodynamics of the living cell. Gibbs free energy and energy conversions in living organisms. Energy rich compounds. Importance of ATP in energy exchange. Free energy and thermodynamic function. Mechanisms of energy coupling. Oxidation-reduction reaction and standard redox potential. Simple calculations based on these concepts. Oxidative phosphorylation and photosynthetic phosphorylation. Natural and artificial membrane bilayers. Unit membrane hypothesis. Membrane transport Systems. Ionophores.

## **SECOND SEMESTER.**

### **MBC 320: CLINICAL BIOCHEMISTRY (3 Credits)**

Pancreatic function tests - to include secretion 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 HCl secretion, histamine and augmented histamine tests. Fractional and tubeless test meals. Instestinal absorption test, Vitamin absorption test, the Congo red test for amyloidosis and faecal fat estimations. Diseases of the muscle. Lipidaemias, hyper and hypolio- proteinemia - definition, causes and investigation. Physiology of the kidney, renal clearance . Urea clearance, creatinine and inulin clearances. Concentration and dilution tests. Impairment of renal failures. Azotaemia. Anurial. Sodium loss in renal diseases.liver function tests. Jaundice types and pigment excretion in jaundice; urine and Blood urea ammonia. Urinalysis. parproteinaemia, Bounce Jones proteinuria and its Significance.

### **PHS 321: ANIMAL EXPERIMENTATION/DESIGN OF EXPERIMENT**

(2 Credits)

Laboratory animal experimental techniques in physiology: Past and present Basic instrumentation, Tissue preparations. Investigation techniques and Design of Experiment Basic skills of Proposal writing. Data management.

### **MBC 321: MICROBIOBIAL PHYSIOLOGY AND BIOCHEMISTRY**

(3 Credits)

Microbial growth changes in cell population and macro molecular composition during the growth process. Growth under nutrient limiting and non limiting conditions. Microbial metabolism carbohydrate, protein and lipid metabolism. Metabolic enzymes, sources of reducing power. Energy yields Biosynthesis intermediates and products. Structure and functions of cell mechanisms in microbial metabolism.

**MBC 322: INTRODUCTORY MOLECULAR BIOLOGY (3 credits)**

Purines, pyrimidines, Nucleic acids. Structure and function of DNA and RNA. Detailed treatment of the Watson-Crick Model of DNA and other forms of DNA. Nucleases. Endo and Exo nucleases. Restriction endonuclease. DNA supercoiling and link number. Topoisomerase. Genome Organization.

A study of the structure and function of the genetic material in relation to genetic expression and control in prokaryotes at the level of transcription and translation, operons, transmethylation and acetylation including cellular ultrastructure. Chromosome structure and gene expression in eukaryotes. Normal and pathological Ultrastructure of the cell. Organelles of prokaryotes Vs eukaryotes. Biosynthesis of proteins. Transcription and transcriptional modification of RNA Translation. Translation in cell free system. Inhibitors of RNA synthesis. Regulation of transcription including operon.

Mutations and Mutagens. DNA damage and repair. Carcinogenesis; basic aspects relating to mechanisms of neoplastic transformation and application of molecular Biology. Inhibiting of DNA repair. Pathological manifestations of defective DNA repair including Xeroderma pigmentosa, ataxia Abnormalities in nucleic acid metabolism. Biochemistry of hereditary dominant and recessive traits. Genetic diseases. Biochemical basis of Genetically inherited diseases. Phenylketonuria, albinism, galactosemia, sickle cell anaemia and thalassemia.

Mitotic and Meiotic Chromosomes: (including spermatogenesis, protamines, lampbrush Chromosomes). Pathology of meiosis and Mitosis Bloom syndrome. Endomitosis, Deletion, Duplications, translocations and inversions.

**MBC 325: TECHNIQUES IN BIOCHEMICAL RESEARCH (2 Credits)**

Principle of Analytical Biochemistry. Cell fractionation, extraction and analysis. Basic Chromatography techniques (Paper, thin layer and gel). Electrophoresis (Paper, gel, Isoelectric focusing) etc. spectrophotometry. pH measurements. Manometric procedures of oxygen electrode and calorimetry. Isotopes in Biochemistry.

Quantitative problems based on the foregoing techniques and interpretation of data. Autoradiography and techniques of radiolabelling.

**MBC 327: STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (2 Credits)**

Students will be attached to a hospital/medical laboratory for a period of 12 weeks during the long vacation. The programme is coordinated by the Department at the completion of the 300 level. A written report is presented at the end of the programme by each participant. The report includes the 200 level IT experience with relevant log books. The SIWES Coordinator (a member of staff in the Department) visits the students during the period to assess the organization, work ethics and involvement of the students.

**MBC 329: INTRODUCTION TO BIOCHEMICAL LITERATURE (2 Credits)**

History and philosophy of science. Growth and development of Biochemistry over the years emphasizing major breakthrough in Biochemical research. Introduction to Biochemical literature. Effective use of library for literature search. Preparation of dissertations and written discussions are presented in class.

**MMB 321: INTRODUCTORY MICROBIOLOGY (1 Credits)**

History, morphology, growth and nutrition. Classification and identification of bacteria. Bacterial genetics, bacteriophages, viruses, infection and resistance to infection. Sterilization and disinfection. Antimicrobial agents. Introduction parasites and fungi.

**PCO 320: INTRODUCTORY PHARMACOLOGY (2 Credits)**

History of Pharmacology and its development. Introduction to pharmacokinetics; drug absorption and bioavailability. Drug metabolism, pharmacogenetics. Effects of disease on drug kinetics. Drug in pregnancy and the extreme age. Pharmacodynamics; dose-response relationships, LD<sub>50</sub> ED<sub>50</sub> and

TD<sub>50</sub>. Therapeutic index; introduction of new drugs, clinical trials; adverse drug reactions and adverse reaction surveillance.

#### **400 LEVEL**

##### **FIRST SEMESTER.**

##### **MBC 410: REGULATORY MECHANISMS (2 Credits)**

Regulatory mechanisms. Principles and features integration of metabolic pathways. Relationship of Krebs's cycle to protein, Carbohydrate, Lipid and nucleic acid metabolic pathways – glycolysis, pentose phosphate pathway, TCA Cycle. Turnover rates and metabolic pools. Feedback inhibition. Regulation and control to aliphatic and aromatic amino acid in the biosynthesis of amino acids in Micro-organism. Endocrine system and mechanism of hormone control of metabolism.

##### **MBC 411: ADVANCED ENZYMOLOGY (3 Credits)**

Enzyme active site Explanation of the high efficiency of enzymes as catalyst. Theories of the nature of active site Active site directed reagents. Regulatory site. Methods of investigation of the nature of the enzyme active site, Enzyme assays. Criteria for determining purity of enzyme. X-rays-techniques in the study of enzymes. Chemical modification of enzyme activity. Enzyme reaction mechanism. Hill plot Adair Monod Wyman and Changeux models konshland – newmethy filmer model.

Regulatory enzymes. Molecular model for allesterism/Examples of allesteric enzymes (ATPase, phosphofructokinase, pyruvate kinase). Explanation of positive and negative cooperativity of these model. Distinction of the various models. Chemistry of enzyme catalysis. Energy of Activation and Arrhenius plots. Transient Kinetics and steady state kinetics pH, Temperature and enzyme action. Multiple enzyme complexes Mechanism of action of well known enzymes eg. Ribonuclease, Chymotrypsin, lysozyme, alcohol dehydrogenase and pyruvate dehydrogenase. Detailed study of the enzymes of the respiratory chain.

##### **MBC 412: TISSUE BIOCHEMISTRY (3 Credits)**

The liver structure function glucostatic function and nitrogen metabolism of the liver. The kidney-structure and function. Urine formation and osmoregulation. Tubular transport mechanism. Excretory and detoxification function Acid-base regulation. Lymphatics and other fluids muscle structure and composition mechanism of contraction. Neurochemistry – nerves, synapses membrane potential. Depolarization. Biochemical aspects of brain techniques of fractionation. Neurotransmitters. Biochemistry of vision and cardiac tissue. Adipose tissues and their metabolism. Structural tissues: elastin and collagen.

##### **MBC 413: BIOCHEMISTRY OF MEDICINAL PLANTS (2 Credits)**

Organization of plants cells and plant cell wall. Alkaloids flavonoids, lignin and plant hormones. Biosynthesis of alkaloids and Carotenoids Opium and Cocaine. Saponins. Caffeine in Plants. Unusual amino acids in plants. Pyrimidine and purine nucleosides. Metabolism of auxins, gibberellins and cytokinins. Current development in the biochemistry of medicinal plants. Plant hormones. Mineral metabolism. Aspects of Nitrogen metabolism in plant.

##### **MBC 414: NUTRITION AND FOOD SCIENCE (3 Credits)**

Principles of Nutrition. Review of various food items and their roles in nutrition. Meat, fish, fruits, vegetable oils, milk and milk products. Nutritional requirements of a varied population in a community, the role of local foodstuff in the management of diseases e.g. Kwashiorkor and marasmus, Obesity, Diabetics, Coronary heart disease, hypertension, constipation and Piles, renal disease, hepatitis and jaundice, Anaemia, Cholera, diarrhoea and underweight. The nutritive value of food with emphasis on local foodstuff. Metabolic disturbance related to dietary deficiencies and excess. Etiology and biochemical basis of malnutrition kwashiorkor and marasmus. Nutritional Disorders. Assessment of nutritional status Environmental and social features related to malnutrition. Toxic substances in foods especially local food. Food stage (chemistry and microbial) Browning reactions. Quality

Control and biodeterioration of food products, food toxicants and detoxification mechanisms. Food additives and preservatives. Feed formulation, cereal formulas.

**MBC 415: BIOCHEMISTRY OF HORMONES (2 Credits)**

Evolution of hormones. Action and classes of hormones. Intracellular mediators of hormones. Hormone receptors .binding activity and response Genetics of binding. Mode of hormones. CAMP as second messenger, role of calcium and other ions. Amino acid derived hormones, steroid hormones and polypeptide hormones. Hormones agonist antagonist and partial agonists. Biosynthesis of hormones.

**MBC 417: BIOMEMBRANES (2 Credits).**

Definition. Type and functions of membrane. Membrane Composition. Membrane asymmetry and movement Diffusion, rotation and Fluidity. Isolation and identification. Election microscopy and maker enzyme assays. Introduction to receptor function Antigenicity of membrane components Cell membrane and toxins. Transport process mode of action of polymyxin and ionospheres antibiotics. Introduction to neurotransmission.

**MBC 418: SEMINAR (2 Credits).**

Students carry out intensive literature search and present seminars on selected topics.

**SECOND SEMESTER.**

**MBC 420: CLINICAL AND FORENSIC BIOCHEMISTRY (3credits)**

The medical biochemist in health care delivery and Forensic medical collection and preservation of sample. Test of general well being to include urine, blood, renal and liver function test. Electrolyte balance and endocrine function. Thyroid function test. Infertility investigations. Haemoglobinopathes, sickle cell disease Trace element in nutrition. Enzymes in diagnosis. Pathological samples. Cancer and chemotherapy. Biochemical basis of inherited disease. Forensic science and sampling DNA fingerprinting and PCR in forensic biochemistry parental suties.

Blotting and hybridation techniques. The course covers the theoretical biochemical basis of laboratory tests and clinical significance in diagnosis and management of diseases.

**MBC 421: BIOCHEMICAL PHARMACOLOGY (2 Credits).**

Meaning and importance of chemotherapy. Structure/function relationship of drugs. Designing of new drugs. Transport and tissue distribution of drugs-Blood, membranes, CNS, foetus placental. Biochemical factors that influence drug action. Drug receptor (proteins, nucleic acids, liquids etc) Mode of action of drugs selective toxicity and drug action.

Drugs affecting the CNS. Opium and the addictive drugs Anti malaria Drugs. Trypanosomes and its economic importance. Metabolic effect of antibiotics and other drugs.DNA antimetabolites, RNA antimetabolies antimetabolites from plant phytoeamagglutinins, goitrogen, cyanogens, lathyrogen, protease inhibitors and favism.

**MBC 422: ADVANCED MOLECULAR BIOLOGY (3 Credits).**

Techniques in nucleic chemistry (Isolation, purification and characterization, including sequencing of RNA and DNA). The role of restriction endonucleases and its application, and molecular explanation of some diseases e.g. Haemoglobinopathes. DNA replication and pathology of defective DNA synthesis. Polymerase chain reactions. Cloning and Recombinant DNA technology. Extra chromosomal factors, plasmids, episomes.

Recombinant mechanisms and transfer of genetic information in bacteria (transformation, conjugation including plasmids f, 12 and col). Mechanism of drugs resistance, high frequency of recombination "H fr" donor states, transfer of chromosomal genes interrupted mating experiments and genetic mapping. Sex duction, transduction including phage-bacterium interactions, Virulent Vs temperate phage, lysogenic response, genetic control lysogeny, immunity in a Lysogenic state, generalized vs restructured transduction.

Animal's viruses: (classification, virus-host cell interaction, viral replication including specific examples of viral disease. Mechanism of infection by virus. Hybridization techniques; DNA denaturation and renaturation, southern blotting mechanism, application to perinatal diagnosis, e.g. in hemoglobinopathies. Cloning techniques. Cellular. Reaction to injury.

**MBC 423: INORGANIC BIOCHEMISTRY (2 Credits).**

Trace elements of biological systems. Incorporation of nitrogen and sulphur, minerals in biological process. Na, K, Ca, (ionic gradients, mineralization, blood clotting) Metalloproteins containing Zn, Fe, Co, Cu, and Mo.

**MBC 425: INTRODUCTION TO BIOTECHNOLOGY (2 credits)**

Introduction – definitions, (Dimensions and units). Scope of bioengineering. Microbial growth-Requirements of growth. Types of media, the batch culture (Parameters of growth, mathematical model of simple batch culture, diaxic growth, Limitation) Factors affecting growth and product formation (energy and Carbohydrates, Hydrocarbons, oxygen temperature, pH). Biochemistry of microbial growth, energetics and kinetics of microbial growth. Downstream processing in Biotechnology and general instrumentation. Fermentation of good related products. Microbial gums and other polymers. Enzyme production. Immobilised enzymes and applications. Pollution control, genetic engineering. Application in Biotechnology..

**MBC 426: BIOCHEMISTRY OF PARASITES & VIRUSES (3 Credits).**

Metabolism of biomolecules in parasites contrasted with that of the host, Host-parasite interactive parasite nutrient needs. Defense mechanism in parasitism. Biomembranes of parasites. Biochemical drug action against parasitism. Summary of structural properties of different classes of viruses. Viral multiplication mechanisms. Control of viral replication. Interference.

**MBC 499: PROJECT (6 Credits).**

Independent research in selected areas of topic under the supervision by an academic member of staff that has interest in that area. Students will be required to carry out literature survey on topics, perform experiment and produce four bound copies of report.

**FOUR YEAR B.Sc. DEGREE PROGRAMME – MEDICAL BIOCHEMISTRY**

1. At the 100 level, students take courses in chemistry, Biology and physics. At the 200 and 300 levels, apart from core course in medical Biochemistry, students are required to take stipulated courses in physiology, Anatomy/Medical microbiology. At the 400 level, students take all courses from the department
2. Student at the end of the 200 and 300 level programme get involved in the student industrial work experience scheme (SIWES). The 12 week attachment programme to a hospital/medical laboratory is coordinated by the department. This is mandatory for all majors. A written report is presented at the end of programme, for evaluation.
3. In the final year, each student presents a seminar. The presentation is on a selected topic, after comprehensive literature review.
4. The project is a laboratory/experimental research under supervision by an academic member of staff. A written dissertation is submitted for evaluation; Student requires a minimum of 30 credits and a maximum of 50 credits. Students must accumulate at least 60 percent of the required credits for graduation from biochemistry.

**DEPARTMENT OF MEDICAL LABORATORY SCIENCE  
SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL  
SCIENCES BACHELOR OF MEDICAL LABORATORY SCIENCE  
(BMLS) PROGRAMME**

**Academic Staff of the Department of Medical Laboratory Science**

S/NO.	NAMES	QUALIFICATION	POSITION
1.	Dr. M.A. Emokpae	Ph.D, MSc, FMLSCN	Senior Lecturer/HOD
2.	Prof. I. N. Ibeh	Ph.D. AIMLS M.Sc. MNAAS, FIIAS	Professor
3	Rev. Dr. F.E. Oronsaye	AIMLS MSc, DD Ph.D (Benin)	Senior Lecturer
4	Dr. H. B. Osadolor	Ph.D, FMLSN, FASCP (Benin)	Senior Lecturer
5	Dr. K.C. Anukam	AIMLS, Calabar, MSC, Ph.D FASCP	Senior Lecturer
6	Dr. (Mrs) H.O. Ogefere	B.Sc. (Benin), AIMLS, M.Sc (Benin), Ph.D (Benin), FMLSCN (Nigeria)	Senior Lecturer
7	Dr. (Mrs) E.O. Osime	AIMLSC, FIMLSC MSC, Ph.D	Senior Lecturer
8	Dr. M.A. Okungbowa	Ph.D, FMLSCN, MSC, (Uniben), AIMLT, MIBMS (London)	Lecturer I
9	Dr. F.O. Akinbo	B.Sc, AIMLS, M.Sc., Ph.D	Senior Lecturer
10	Mr. B.I.G. Adejumo	MMLS, FIMLT AIBMS	Lecturer II
11	Mr. O.F. Amegor	MSc. PGD, AIMLS.	Lecturer II
12	Dr. (Mrs.) Zainab Omoruyi	Ph.D, AIMLSCN.	Lecturer I

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13	Mr. G.O. Igharo	B.MLS Chemical Path. M. Tech (Applied Biochemistry)	Asstt Lecturer
14	Mr. A.I. Aruomaren	BMLS, AMLSCN	Graduate Assistant
15	Progress A. Obazelu (Mrs)	B.MLS (Hematology/Blo od Transtusion Science), AMLSCN	Graduate Assistant
16	Mrs. Moses-Otutu	BMLS, Medical Microbiology ALMSCN OND (Science Laboratory Technology)	Graduate Assistant
17	Mr. Odigie B. Efosa	B.MLS (Histopathology) AMLSCN	Graduate Assistant

**TECHNICAL STAFF**

S/NO.	NAMES	QUALIFICATION	POSITION
1.	Mrs. L.A. Emokpae	A.I.M.L.S	PMLS
2.	Mr. Otutu Williams	A.I.M.L.S	MLS I
3.	Mrs. J. Osunbor	BMLS	MLS I
4	Mrs. A. N. Olise	AIMLS/MSC MLS	MLS I
5	Mr. F. U. Uzamere	AIMLS	MLS I
6	Mrs. E. Otamere	AIMLS	MLS I
7	Mr. N.S. Owie	BMLS	MLS I
8	Mrs. B. Onuyo	BMLS	MLS I
9	Mrs. I. Omusi	BMLS	MLS I
10	Mrs. S. Oronsaye	BMLS	MLS I
11	Mrs. F. Newton Esebelahie	BMLS	MLS I
12	Mr. N. Dimowo	BMLS	MLS I

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13	Mr. H. Efeziri	BMLS	MLS I
14	Mr. S. Ogieriakhi	CMLS	Med. Lab. Assist.
15	Mr. M. I. Elaiho	BMLS	MLS II
16	Miss E. O. Ehigiator	BMLS	MLS II
17	Mr. F. O. Osula	BMLS	MLS II
18	Mr. B. E. Odozi	BMLS	MLS II

#### ADMINISTRATIVE STAFF

S/NO.	NAMES	QUALIFICATION	POSITION
1.	Mrs. Ijeoma Ugiagbe	B.Sc., MSC	Higher Executive Officer
2	Mrs. E. A. Isaiah	Diploma in Public Administration	Principal Executive Officer II
3	Mrs. E. Evbuomwan	35 W.P.M	Typist II
4	Mrs. Grace Ijekhemen	S.S.C.E	Senior Clerical Officer
5	Mrs. Maria Ikeleke	WAEC, NTI	Clerical Officer

#### INTRODUCTION

In line with the mission of the University which is to develop the human mind to be creative, innovative, research oriented, competent in areas of specialization, knowledgeable in entrepreneurship and dedicated to service, the Medical Laboratory Science Department offers courses leading to the award of Bachelor of Medical Laboratory Science (BMLS) Honours degree.

Medical Laboratory Science is a promising dynamic profession that is designed to provide a broad basis of fundamental scientific knowledge and its application such that the graduands are well prepared to meet with changing needs

of modern scientific knowledge considering their pivotal role in Health care delivery system. The training exposes students to application of medical laboratory science in key areas such as clinical diagnostic services, food and beverages, pharmaceutical industries, Breweries, utility departments e.g. Water Corporation, academic and research institutions.

The training exposes students to basic services, basic medical sciences and to core areas like Clinical Chemistry, Haematology/ Blood Transfusion Science, Medical Microbiology/Parasitology, Histopathology, Immunology/Immunochemistry as well as instrumentation and laboratory management.

Mode of admission is by UME (5 - year programme) and by Direct Entry (4-year programme). Students accepted for the BMLS programme are expected to register with the Medical Laboratory Science Council of Nigeria (MLSCN) and be indexed as student members soon after admission into the programme. On successful completion of the BMLS programme, induction into the profession and mandatory one year internship preceding participation in the NYSC programme, graduates are registered as Associate members (AMLSCN) with the professional body, Medical Laboratory Science Council of Nigeria, subject to meeting its other requirements.

#### PHILOSOPHY

The Bachelor of Medical laboratory Science degree is designed to:

- (a) Highlight the central role of the laboratory investigation of components of biological fluids, blood, urine, cerebrospinal fluid, secretions, excretions, tissues or organs, play in the diagnosis, management and prognosis of disease state.
- (b) Have sufficient management ability to play a leadership role in training and the practice of Medical Laboratory Science.

- (c) Enable students acquire the expertise to produce biological and diagnostic reagents as well as fabricate new equipment or repair or even modify existing ones and refine old techniques or introduce new diagnostic procedures.

#### **AIMS/OBJECTIVES**

- (a) To organize and offer courses and such related studies to undergraduate students as may be prescribed by the Senate of the University and Medical Laboratory Science Council of Nigeria leading to the award of the degree of Bachelor of Medical Laboratory Science. (BMLS)
- (b) To train and develop undergraduate students to fill the manpower needs of the country in Medical Laboratory Science.
- (c) To produce Medical Laboratory Scientists who satisfy International standards and who can undertake further training towards specialization.
- (d) To train up research scientists who are able to make researches in the various discipline of Medical Laboratory Science.

#### **ADMISSION REQUIREMENTS**

- (A) Admission through UME: Candidates must also satisfy the minimum University requirements for admission and are therefore to obtain credits in English Language, Chemistry, Biology, Physics and Mathematics in SSCE or its equivalent in not more than two sittings with a relevant pass in the Joint Matriculation Examination (JME) and in the Post University Matriculation Examination (Post UME).
- (B) Admission by Direct Entry:
  - (i) Candidates holding three GCE A/L in Biology, Chemistry and Physics plus O/L Credits in five subjects – Mathematics, Physics, Chemistry, Biology and English Language.

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- (ii) Candidate who transfers from other faculties of the University with relevant prerequisites.
- (iii) B.Sc. degree in relevant science disciplines like Zoology, Microbiology, Anatomy, Physiology, Biochemistry, etc; as approved by the senate.
- (iv) HND in relevant fields as approved by the senate.

- (C) No transfer is allowed. Please see MLSCN Accreditation Report

#### **COURSE DURATION**

The Bachelor of Medical Laboratory Science degree programme shall run for five (5) years for Joint Matriculation Examination candidates and four (4) years for direct entry candidates.

#### **REGISTRATION OF COURSES**

**At the beginning of the session, the students must register for all the courses specified for the respective session.**

**NOTE:** The 100 level students will spend their first year in the Faculties of Life and Physical Sciences. The students will subsequently move along until 300 level when they will be given special attention in the department.

#### **EVALUATION OF STUDENTS**

Each MLS Course taught in the BMLS Programme at the University may be evaluated for grading with the use of one or several of the following criteria:

- (i) Written examinations which include problem solving:-
  - (a) Essay: Six (6) questions to attempt four (4).
  - (b) Multiple choice question (MCQ) 40 questions (5 parts) to attempt all.
- (ii) Laboratory presentations or demonstrations to the class of exercises/techniques.
- (iii) Laboratory Reports.
- (iv) Case studies/Laboratory logbook.

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(v) Continuous assessment tests.

No students shall be allowed into the examination venue if he/she has not fulfilled the mandatory posting.

#### **CONTINUOUS ASSESSMENT**

Continuous Assessment (CA) during the Semester shall form part of the end of course grade. Its overall contribution shall be 25% of each course examination.

#### **END OF THE YEAR OVERALL ASSESSMENT**

The pass mark for 100, 200 and 300 level students in the department shall be 45% while 400 and 500 level students pass mark shall be 50%.

A student shall be deemed to have passed his/her examinations if he/she passes in all the compulsory and required courses he/she registered for during the academic year. Any 500 level student who at the end of final year examinations accumulate less than the prescribed total minimum credits or does not pass in all the required courses but who has accumulated the required minimum credits to remain in the department will be required to register or take the course(s) in the following session and to sit for the appropriate examinations.

#### **A SUMMARY OF THE CREDIT LOAD FOR THE PROGRAMME**

<b>LEVEL</b>	<b>CREDIT LOAD</b>	<b>TOTAL CREDIT LOAD</b>
100		50
200		50
300		40
400		42
500	Chem. Pathology 39	221
	OR	
500	Haem/BTS 39	221
	OR	
	Histopathology 39	221
	OR	
	Med. Microbiology 39	221

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#### **ATTENDANCE POLICIES**

1. Attendance is compulsory and absences from class and/or laboratories will affect student's final grade. Missed laboratory work and/or examinations must be completed.
2. Since sample procurement is difficult, laboratory absences are particularly difficult to make up 75% attendance is a prerequisite to sit exams. Absence from laboratory postings is tantamount to carry over of posting. Students are therefore advised not to miss any laboratory session.
3. Protracted illness (three consecutive days or more) should be reported to the head of Department promptly.
4. Students shall continue their laboratory posting during holidays and this shall serve as their industrial attachment.
5. Final year students are to take compulsory call-duty in their respective Discipline. They are to be attached to med. Lab scientist m- call-duty. This shall be graded part of the 75% attendance laboratory posting.

#### **GRADUATION REQUIREMENTS**

**(I) Deferred entry requirement: e.g. credit pass in English at SSCE or GCE O/L.**

#### **THERE ARE NO DEFERRED ENTRY REQUIREMENTS**

- (i) Minimum number of credit hours: 221
- (ii) Minimum number of years of the Course: 5 years (UME) and 4 years (DE)
- (iii) Minimum CGPA 1.00-1.49

#### **CLASSIFICATION OF DEGREE:**

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A Grade Point Average (GPA) shall be calculated for each level of course. The students' final grade form the sum of the weighted Grade Point Average for each level of the courses is as follows:

5 year Degree Programme	4 year Degree
100 level 10%	200 level 10%
200 level 15%	300 level 20%
300 level 20%	400 level 30%
400 level 25%	500 level 40%
500 level 30%	

**COMPUTATION OF GRADE POINT AVERAGE (GPA)**

To compute a grade point average (GPA) for a candidate, his total aggregate point for the session will be divided by the total credit load for the session.

**N.B.**

- (A) Core courses are courses, which all students must take and pass before they can graduate.
- (B) Mandatory courses are courses, which students must take but do not have to pass before they can graduate.

**The class of degree is determined by the final grade as follows:**

First Class Honours	4.50 – 5.00
Second Class Upper Division	3.50 – 4.49
Second Class Lower Division	2.40 – 3.49
Third Class	1.50 - 2.39
Pass	1.00 - 1.49
Fail	Less than 1.00

**PERFORMANCE GRADE IN EACH COURSE**

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

**PROFESSIONAL EXAMINATION**

Students are required to satisfy examiners in professional examinations to be moderated by external examiners in the various Medical Laboratory Science disciplines which will be observed by a representative of Medical Laboratory Science Council of Nigeria. The examinations shall be in two parts viz:

- First Professional Examinations to be held last Semester of the forth year shall consist of two parts; Papers 1 and II – consists of practical examination in Medical Microbiology, Parasitology, Haematology, Blood Transfusion Science, histopathology, Chemical Pathology. Candidate will be required to attempt question in Parasitology, and in any 4 of the other core subjects. Questions shall include steeple chase spot questions-3 hours

Viva voci (Oral) examination

A pass in this examination is a prerequisite for the 500 level.

- Final Professional Examination to be 2<sup>nd</sup> Semester of final graduating year which shall consist of practical and oral examinations in the specialty discipline of the candidate. There shall be two papers in morning and afternoon sessions.

**Pass mark in both examinations is 50% i.e. C grade point**

**Resit examinations may be conducted not later than 3 months after the main examination.**

**EXAMINATION MISCONDUCT**

**The following sanctions shall apply to cases of examination misconduct as stipulated below.**

S/N	MISCONDUCT	SANCTION
1	Proven cases of fore-knowledge of	Expulsion of all

	Examination Questions (Leakage)	involved.
2	Coming into Examination Hall with extraneous materials	Rustication for a minimum period of 4 Semesters or Expulsion if fore-knowledge of Questions is proven.
3	Writing on any materials in the Examination Hall, other than the Answer Booklet	Letter of warning
4	Non production of Identity card or authorized letter of identification before and during examination.	To leave the Examination Hall immediately
5	Any form of unauthorized communication between and among students during examination	To lose 10 minutes of examination time; if it persists, relocate the student; further persistence cancel the paper.
6	Impersonation at Examination	Expulsion of all involved.
7	Refusal to fill Examination Misconduct Form	Rustication for (2) Semesters plus penalty for the original offence.
8	Attempt to destroy or actually destroying materials of proof of cheating	Rustication for (2) Semesters plus penalty for the original offence.
9	Refusal to obey invigilator's instructions such as: (iii) Writing after the Examination Has been Stopped. (iv) Non compliance with the invigilator's sitting	(iii) Letter of Warning (iv) To leave the hall and carry-over the course

	arrangement	
10	Refusal to submit Answer scripts (used and unused) at the close of examination	Rustication for a minimum period of (2) Semester.
11	Smuggling of Question papers and Answer Booklets out of the Hall for help and returning with Answer Scripts	Expulsion
12	Failure to write matriculation numbers on Answer Booklet or to sign Attendance Sheet	Letter of Warning
13	Writing of candidate's names on Answer Booklets	Letter of Warning
14	Leaving Examination Hall without permission	To carry-over the course and Letter of Warning
15	Failure to draw a line through each blank space at the end of each answer	Letter of Warning
16	Unruly behavior in the Examination Hall such as smoking, drinking of liquor, noise etc	Verbal warning by Invigilator. If unruly behavior persists, to leave the Hall and carry over the course
17	Proven cases of physical assault on Invigilator/Attendant	Expulsion
18	Failure to appear before Misconduct Panel	Guilty as charged. Indefinite suspension pending appearance before the Panel.
19	Any student with three(3) letters of warnings	Rustication for a minimum period of one (1) Session.
20	Any other cases of Examination	Punishment as

malpractice not specified	appropriate.
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#### WITHDRAWAL FROM DEPARTMENT

- (A) Students who accumulate 11-21 credits in the session are either to seek inter faculty/department transfer or remain in the department on probation.
- (B) Students who fail to accumulate less than 11 credits at the end of the second semester examination will be asked to withdraw from the department.
- (C) Any student who has previously transferred from another faculty/department or gone on probation and still fails to obtain 22 credits after the sessional examination shall withdraw from the department.
- (D) The Senate (if satisfactory reasons are given) may grant a student temporary withdrawal from the school. The student could be allowed to register and take the examination in the required courses at the next available opportunity provided, he does not exceed the maximum number of years required for the degree.

#### COURSE CODE SYSTEM

Course code contains an abbreviated letter code of three (3) letters and three (3) digits.

MLS – is a prefix that indicates the department

The first digit represents the level of study. For 100 – 400 Levels the second digit denotes the semester while for 500Level the second digit denotes specialty area.

The third digit denotes the topic/stress area.

#### DRESS CODE

**MALE:** A good pair of trousers (not jeans) with neat shirt, a matching tie and a pair of shoes.

**FEMALE:** Corporate gown with sleeve or skirt (not jeans) below the knee with sleeved shirt/blouse and a pair of shoes.

Student professional Lapel pin should be worn always on their dresses/shirt

**Wearing of Laboratory coat is compulsory for all clinical laboratory postings and practical classes**

#### COURSE OUTLINE

##### 100 LEVEL

##### FIRST SEMESTER

COURSE CODE	COURSE TITLE	CREDIT LOAD	L T P
CHM 111	General Chemistry 1	3	203
CHM 113	Organic Chemistry 1	3	203
PHY 111	Mechanics, Thermal Physics And Properties of Matter	3	203
PHY 113	Vibrations, Waves & Optics	3	203
PBB 111	Diversity of Plants	3	203
AEB 111	Introduction to Animal & Environmental Biology	3	203
GST 111	Use of English 1	2	200
GST 112	Philosophy and Logic	2	200
BMS 111	Elementary Mathematics1	3	230
TOTAL		25	

##### SECOND SEMESTER

CHM 122	General Chemistry II	3	203
CHM 124	Organic Chemistry II	3	203
PHY 109	Practical Physics	2	222
PHY 124	Electromagnetic & Modern Physics	4	303
AEB 122	Functional Zoology	4	301
BMS 121	Elementary Mathematics	3	203
GST 121	Use of English II	2	200
GST 122	Nigerian People & Culture	2	200
GST 123	History & Philosophy of Science2		200
TOTAL		25	

**TOTAL CREDIT LOAD FOR THE SESSION 50**

##### 200 LEVEL

**FIRST SEMESTER**

COURSE CODE	COURSE TITLE	CREDIT LOAD	LTP
MLS 211	Introduction to Medical Laboratory Science I	2	200
ANT 210	General Anatomy, Gross Anatomy of the upper limbs	2	203
ANT 211	Gross Anatomy of Thorax	2	203
ANT 212	General Histology and Cytology	2	203
ANT 213	General Basic Embryology	2	200
PHS 211	Introductory & General Physiology	2	200
PHS 212	Blood & Body Fluid Physiology	2	203
PHS 213	Cardiovascular System	2	200
PHS 214	Respiratory Physiology	2	200
MBC 210	Introductory Biochemistry	2	200
CSC 110	Introduction to Computer	3	203
<b>TOTAL</b>		<b>23</b>	

**SECOND SEMESTER**

MLS 222	Introduction to Medical Laboratory Science II	2	201
ANT 220	Gross Anatomy of the abdomen, Pelvis and Perineum	2	200
ANT 222	Systemic Histology I	3	203
ANT 223	Systemic Embryology I	3	203
MBC 220	Carbohydrate and Lipid Metabolism	3	203
MBC 223	Amino Acid and Protein Metabolism	3	203
MBC 225	Protein Chemistry and Enzymology	3	203
PHS 221	Renal Physiology	2	200
PHS 222	Gastrointestinal Physiology	3	203
PHS 223	Endocrinology and Reproduction	2	200
PHS 224	Temperature Regulation	1	100
<b>TOTAL</b>		<b>27</b>	
<b>TOTAL CREDIT LOAD FOR THE SESSION</b>		<b>50</b>	

**300 LEVEL****FIRST SEMESTER**

COURSE CODE	COURSE TITLE	CREDIT LOAD	LTP
CED 300	Introduction to Theory & Practice of Entrepreneurship	2	210
MLS 311	Medical Laboratory Science Ethics	2	200
MLS 312	Introduction to Medical Laboratory Science III	3	200
MLS 313	Medical Physics	3	201
MLS 314	Basic Clinical Chemistry	3	203
MLS 315	Basic Immunology	2	200
MLS 310	Laboratory Posting I (SIWES)	3	016
MBC 312	Intermediary Metabolism	2	200
<b>TOTAL</b>		<b>19</b>	

**SECOND SEMESTER**

MLS 320	Laboratory Posting II (SIWES)	3	016
MLS 321	Introductory Microbiology	2	203
MLS 322	Laboratory Instrumentation & Techniques	3	302
MLS 323	Fundamental Blood Transfusion Science	3	203
MLS 324	Basic Haematology	3	203
PCO 320	Introductory Pharmacology	2	200
MLS 325	General Pathology (Basic Histopathology)	3	203
MLS 326	Laboratory Management & Organization	2	200
<b>TOTAL</b>		<b>21</b>	
<b>TOTAL CREDIT LOAD FOR THE SESSION</b>		<b>40</b>	

Industrial attachment in accredited hospital or medical/research laboratory for a period of three months. Supervision and training in the hospital laboratory shall be conducted by consulted medical laboratory scientists with current practicing license issued by Medical Laboratory Science Council of Nigeria.

**400 LEVEL****FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 410	Laboratory Posting III (SIWES)	3	0	1	6
MLS 411	Medical Parasitology & Entomology	3	2	0	3
MLS 412	Basic Medical Bacteriology & Mycology	3	2	0	3
MLS 413	Introduction to Haemoglobin, Haemoglobinopathy & Myeloproliferation	3	2	0	3
MLS 414	Introduction to Blood Group Systems & Compatibility Tests	3	2	0	3
MLS 415	Analytical Chemistry	3	2	0	3
MLS 416	Introduction to Cytology	2	2	0	3
MLS 417	Nucleic Acid Biochemistry & Basic Concepts of Molecular Biology	2	2	0	0
<b>TOTAL</b>		<b>22</b>			

**SECOND SEMESTER**

MLS 420	Laboratory Posting IV (SIWES)	3	0	1	6
MLS 421	Biostatistics	2	2	0	0
MLS 422	Virology	3	2	0	3
MLS 423	Introduction to Histopathology Techniques and Museum	3	2	0	3
MLS 424	Biomedical Engineering	2	2	0	0
MLS 425	Biotechnology & Bioinformatics	2	2	0	3
MLS 426	Counseling skills	2	2	0	0
MLS 427	Immunology/Immunochemistry	3	2	0	3
<b>TOTAL</b>		<b>20</b>			

**TOTAL CREDIT LOAD FOR THE SESSION 42****FIRST PROFESSIONAL EXAMINATION – PRACTICAL AND VIVA  
500 LEVEL****CLINICAL CHEMISTRY (SPECIALTY)****FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 510	Laboratory Posting V (SIWES)	3	0	1	6
MLS 511	Seminar	2	0	2	0
MLS 512	Research Methodology	3	3	0	0
MLS 531	Carbohydrate, protein and Lipid Metabolism	3	2	0	3
MLS 532	Renal, Liver and Neurochemistry	3	2	0	3
MLS 533	Clinical Enzymology	3	2	0	3
MLS 534	Nutrition and Clinical Vitaminology	2	2	0	0
<b>TOTAL</b>		<b>19</b>			

**SECOND SEMESTER**

MLS520	Laboratory Posting VI (SIWES)	3	0	1	6
MLS 521	Genetics & Molecular Biology	2	2	0	0
MLS 522	Project	6	0	0	8
MLS 535	Drug Monitoring, Toxicology & Inborn Error of Metabolism	3	2	0	3
MLS 536	Clinical & Reproductive Endocrinology	3	2	0	3
MLS 537	Techniques in Clinical Chemistry	3	2	0	3
<b>TOTAL</b>		<b>20</b>			

**TOTAL CREDIT LOAD FOR THE SESSION 39****FINAL PROFESSIONAL EXAMINATION – PRACTICAL & VIVA**

**500 LEVEL  
HAEMATOLOGY & BLOOD TRANSFUSION SCIENCE (SPECIALITY)**

**FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 510	Laboratory Posting V (SIWES)	3	0	1	6
MLS 511	Seminar	2	0	2	0
MLS 512	Research Methodology	3	3	0	0
MLS 513	Cytogenetic	2	2	0	0
MLS 541	Haemopoiesis, Haemoglobin, Haemoglobinopathies & Myeloproliferations	3	2	0	3
MLS 542	Blood Group Systems & Compatibility Tests	3	2	0	3
MLS 543	Serology & Blood Transfusion Science	3	2	0	3
	<b>TOTAL</b>	<b>19</b>			

**SECOND SEMESTER**

MLS 520	Laboratory Posting VI (SIWES)	3	0	1	6
MLS 521	Genetics & Molecular Biology	2	2	0	0
MLS 522	Project	6	0	0	8
MLS 544	Advanced Haematological Techniques	3	2	0	3
MLS 545	Advanced Blood Group Serology Techniques	3	2	0	3
MLS 546	Coagulation and Fibrinolysis Studies	3	2	0	3
	<b>TOTAL</b>	<b>20</b>			

**TOTAL CREDIT LOAD FOR THE SESSION 39**

**FINAL PROFESSIONAL EXAMINATION – PRACTICAL & VIVA.**

**500 LEVEL  
HISTHOPATHOLOGY (SPECIALITY)**

**FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 510	Laboratory Posting V (SIWES)	3	0	1	6
MLS 511	Seminar	2	0	2	0
MLS 512	Research Methodology	3	3	0	0
MLS 513	Cytogenetics	2	2	0	0
MLS 551	Fundamental Histopathology	3	2	0	3
MLS 552	Systemic Histopathology	3	2	0	3
MLS 553	Histochemistry and Histological Techniques	3	2	0	3
	<b>TOTAL</b>	<b>19</b>			

**SECOND SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 520	Laboratory Posting VI (SIWES)	3	0	1	6
MLS 521	Genetics & Molecular Biology	2	2	0	0
MLS 522	Project	6	0	0	8
MLS 554	Medical Cytology	2	2	0	2
MLS 555	Embalment Science and Museum Techniques	2	2	0	2
MLS 556	Immunochemistry	2	2	0	2
MLS 557	Stains and Staining	3	2	0	3
	<b>TOTAL</b>	<b>20</b>			

**TOTAL CREDIT LOAD FOR THE SESSION 39**

**FINAL PROFESSIONAL EXAMINATION PRACTICAL & VIVA**

**500 LEVEL****MEDICAL MICROBIOLOGY (SPECIALITY)****FIRST SEMESTER**

<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CREDIT LOAD</b>	<b>L</b>	<b>T</b>	<b>P</b>
MLS 510	Laboratory Posting V (SWIES)	3	0	1	6
MLS 511	Seminar	2	0	2	0
MLS 512	Research Methodology	3	3	0	0
MLS 561	Systemic Bacteriology	3	2	0	3
MLS 562	Advanced Entomology	2	2	0	3
MLS 563	Public Health Microbiology	3	2	0	2
MLS 564	Medical Mycology	3	2	0	3
<b>TOTAL</b>		<b>19</b>			

**SECOND SEMESTER**

MLS 520	Laboratory Posting VI (SIWES)	3	0	1	6
MLS 521	General & Molecular Biology	2	2	0	0
MLS 522	Project	6	0	0	8
MLS 565	Medical Virology	3	2	2	0
MLS 566	Pharmaceutical Microbiology & Microbial Genetics	3	2	0	3
MLS 567	Laboratory Techniques in Microbiology	3	2	0	3
<b>TOTAL</b>		<b>20</b>			

**TOTAL CREDIT LOAD FOR THE SESSION 39****FINAL PROFESSIONAL EXAMINATION – PRACTICAL & VIVA****DESCRIPTION OF COURSES****100 LEVEL COURSES:****PBB 111: DIVERSITY OF PLANTS 2-0-3 (3 Credits)**

Morphology and life circle of plant and animals. A general study of plant and animal groups from virus, algae/fungi to chordates. Structural and functional study of plants and animal cells, tissues, organs and systems. Taxonomic, physiodropical and developmental studies of plant and animals. Reproduction, genetic, hereditary, substances, mechanism of nuclear decision and stem cell formation, Evolution and medical selection, Biology practical and demonstrations.

**AEB 111: INTRODUCTION TO ANIMAL AND ENVIRONMENTAL BIOLOGY 3-0-3 (4 Credits)**

Man population generals and impact on the biosphere. Formal biodiversity. Invertebrata – protozoa, coelenterate, platyhelminthes, annelida, Mollusca, Arthropoda, Vertebrata – Cephalochordata, pieces, amphibian, reptalia, aves, mammalia, Mammalian anatomy; anatomy of rattus rattus.

**PHY 111: MECHANICS, THERMAL PHYSICS AND PROPERTIES OF MATTER 2- 0-3 (3 Credits)**

Dimensional analysis, Element of statistics. Vector algebra, kinematics and dynamics of a mass point. Elementary mechanics and gravitation. Kepler’s laws. Motion of rigid bodies, moment of inertia, angular momentum. Conservation of laws, simple harmonic, motion. Elastic properties of solids, module of elasticity. Fluid dynamics and hydrodynamics. Laws of themodynamics and thermal energy, temperature, calorimetry. Change of State, critical points. Heat transfer, conduction, convection and radiation. Black body radiation. Gas laws. Kinetic theory of gases. Physics practical and demonstrations.

**PHY 113: VIBRATIONS, WAVES AND OPTICS 2-0-3 (3 Credits)**

Electrostatics, cyikinv’s laws Gauss’ law and simple application, Electric field energy and electrostatics, potentials.

Capacitance, Conductors insulators, dielectrics and polarization. Electric current. Ohm's law, Circuit analysis. "Thermo electricity; Magnetic effects of currents, Ampere's law application. Magnetism, Earth's magnetic field. Faraday's law of induction. Alternating current AC circuits – measuring devices. Hall's effect Optics – basic principle and applications, Eye, Lenses and glasses as applied to common eye defects. Physics practical and demonstration.

**CHM 111: GENERAL CHEMISTRY 1 2-0-3 (3 Credits)**

An introduction to atomic structure and electronic configuration of the elements. Electronic theory of valency. The periodic classification and the general study of the elements with emphasis on similarities and differences based on position in the periodic table. Radioactivity and its application kinetic theory and laws of gases. Properties of dilute solutions. Thermo-chemistry. Chemical equilibrium. Theory of acids, bases and indicators. Phase equilibrium study and multicomponent systems and application in partition and absorption chromatography, Chemistry practical and demonstration.

**CHM 113: ORGANIC CHEMISTRY 1 2-0-3 (3 Credits)**

Introduction to organic chemistry. IUPAC nomenclature, elemental analysis and molecular formulae. Structural isomerism. Isolation and purification methods. The concept of functional growth, resonance and aromaticity. A study of saturated and unsaturated hydrocarbons, cyclic hydrocarbons, alcohols, alkyhalides ethers, aldehydes, comparison of phenols, and aromatic amines with their aliphatic, analogues, Common synthetic polymers and their uses. Introduction to carbohydrates, proteins, oils, and fats. Optical Isomerism, Chemistry practical and demonstrations.

**BMS 111: Elementary Mathematics 1 2-0-3 (3 Credits)**

Polynomials and their factorization, rational function. Trigonometry definitions and elementary properties of

trigonometric, function, radian measure, periodicity of identities. Formulas for sum of products and quotient. The chain rule. Differentiation of definite and indefinite algebraic, trigonometric, exponential and logarithmic functions. Maxima and minimum, tangential and normal. Fundamental theory of calculus simple application to areas and volumes, Methods of integration. Application of different and integration to biological systems.

**GST 111: USE OF ENGLISH 1 2-0-0 (2 credits)**

Modes and methods of effective communication in English. Use of literacy works to improve communication skills, Language skills. Development of reading, and writing skills. Note taking and summarizing from oral English and written materials, writing of essays, answers and other assignments. Instruction on lexis, collection, and organization of materials and logical presentation for written assignment.

**GST 112: PHILOSOPHY AND LOGIC 2-0-0 (2 Credits)**

Introduction: the main branches of philosophy. Symbolic logic. Special symbol in symbolic logic. Conjugation, negation, affirmation, disjunction, equivalence and conditional statement. Law of thought. Methods of deduction using rules of inference and biconditionals. Qualification theory.

**CHM 122: GENERAL CHEMISTRY II 2-0-3 (3 Credits)**

Acids, Bases and salts. Quantitative and qualitative analysis. Theory of volumetric analysis operations and methods. Calculations, mole, molarity, molality. Behaviour of electrolytes. Water, Colligative properties. Ostwald's dilution law. Arrhenius, Bronsted Lowry, Lewis concepts and applications Buffers – introduction to reaction rates Equilibria and equilibrium constants. Solubility products. Common effects. Precipitation reactions Chemistry of Redox reactions.

**BMS 121: Elementary Mathematics**

(3 credits)

Introduction to statistics. Diagrammatic representation of descriptive data. Measures of location and dispersion for ungrouped data. Grouped distribution measure of location and dispersion for grouped data. Problems of grouping. Associated graphs. Introduction to probability, simple space and events, addition law, use of permutation and combination in evaluation probability. Binomial distribution. Linear correlation: scatter diagram, moment and rank correlation, linear regression.

**CHM 124: ORGANIC CHEMISTRY II** (3 Credits)

Polar function group chemistry. Hydroxyl group, carbonyl group, carboxylic group, carboxylic acid derivatives and amino acids. Miscellaneous topics – fats and oils, amino acids proteins, carbohydrates and natural products.

**PHY 109: PRACTICAL PHYSICS 2-2-2** (2 Credits)

Students are expected to carry out a minimum of 12 major experiments covering the main aspect of the courses taken in the year.

**PHY 124: ELECTROMAGNETIC AND MODERN PHYSICS 3-0-3**  
(4 Credits)

Electromagnetism – electric field, steady direct current, Kirchoff's laws, capacitors, Electromagnetic fields, alternating currents, magnetic fields Electromagnetic, induction, and electricity and matter. Modern physics – Structure of atom and structure of the nucleus.

**PBB 122: PLANT FORM AND FUNCTION 2-0-3** (3 Credits)

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

**AEB 122: FUNCTIONAL ZOOLOGY 3-0-1** (4 Credits)

Embryology – gametogenesis, fertilization and cleavage as demonstrated by Amphioxus, Genetics of the cell and distribution

of genetic material, mitosis, meiosis, inheritance, sex determination and sex linked inheritance. Histology, Cells, tissues, organ formation and main features. Physiology: functioning of mammalian skin, muscles/skeleton, alimentary system/nutritional requirements and deficiencies.

**GST 121: USE OF ENGLISH II** 2-1-0 (2 Credits)

Sentences construction including topic and supporting sentences outlines and paragraphs. Punctuations and logical presentations of papers formal, footnotes, quotations, references and bibliography. Documentation, conjections, presentation and editing. Use of the library and basic research methods, phonetics. Art of public speaking and oral communication. Types of libraries, forms of library services. Cataloguing and book classification schemes.

**GST 122: NIGERIA PEOPLE AND CULTURE 2-0-0** (2 Credits)

History, values norms and cultural characteristics of African and the Nigerian society in particular, role of culture in the behaviors of Nigerian. The African society, development, migration, large and small rural movements and its effect on man and disease, the Nigerian rural and urban societies and diseases. Changing patterns of diseases in rural and urban societies. Changing moral values. Cultural nationalism and political revolution of African States. Concepts of religion in humanistic perspectives. Traditional education and its humanistic functions. Rule and concepts of functional education in functional development.

**200 LEVEL COURSE DESCRIPTIONS**

**MLS 211: INTRODUCTION TO MEDICAL LABORATORY SCIENCE I**  
2-0-0 (2 credits)

General introduction to medical laboratory science subjects namely, Clinical Chemistry, Haematology and Blood Transfusion Science. Medical Microbiology, Histopathology and Immunology, Specimen collection, reception and registration. Storage and disposal, Specimen bottle. Safety precaution in pathology laboratories against chemical, biological, electrical

materials and radiation hazards. Techniques and principles of chemical sterilization and physical methods. Glassware cleaning care and maintenance, Breeding of laboratory animals.

**CSC 110: INTRODUCTION TO COMPUTER 2-0-3 (3 credits)**

History of Computer, functional components of a computer, characteristics of a computer, problem solving, flowcharts, algorithm. Basic computer programming: statement, symbolic names, arrays, subscripts expression and control statements. Introduction to visual basic programming, computer applications.

**ANT 210: GENERAL ANATOMY AND GROSS ANATOMY OF THE UPPER LIMBS 2-0-3 (2 credits)**

The general descriptive terms and the techniques as used in the study of the human body would be introduced. The normal anatomical position and the directional movement of the body parts would be introduced. The gross anatomy of the upper limbs: Pectoral region, Axilla and the anastomosis, carpal tunnel, Hand, Nerve Injuries, Osteology and joints of the upper limb, the vascular anastomosis and lymphatic drainage of the breast and upper limb would be studied.

**ANT 211: GENERAL GROSS ANATOMY OF THORAX 2-0-3 (2 credits)**

Description of the thorax: The sternum and ribs, thoracic vertebrae, Heart and great Vessels, thoracic duct, dissection of the entire thoracic region, Azygos system of vein, intercostals spaces, Mediastinum, lungs bronchopulmonary tree and segments thoracic diaphragm, Aorta and respiratory movement. Dissected specimens will be demonstrated to the students.

**ANT 212: GENERAL BASIC HISTOLOGY AND CYTOLOGY 2-0-3 (2 Credits)**

Description Structure and the function of the cell general histology and basic tissues of The body. Preparation of tissues for microscopy, is a practical oriented course that is studied along side with the theoretically based lecture.

**ANT 213: GENERAL BASIC EMBRYOLOGY 2-0-0 (2 Credits)**

General consideration of the male and female reproductive organs, Gametogenesis, Fertilization, implantation, cleavage, the morula, the blastocyst formation of the primitive streak, the Bilaminar and trilaminar germ disc. Development of tissues and organ system of the embryo, the chorionic and amniotic cavities. Foetal membranes placental formation and functions. The molecular regulation in differentiation of tissues and organs and in the establishment and patterning of the body axis Birth defects chromosomal and genetic factors. Twins and twin defects. General characteristics of the embryonic and foetal periods.

**PHS 211: INTRODUCTORY AND GENERAL PHYSIOLOGY 2-0-0 (2 Credits)**

Cells physiology Physiochemical principles, Body fluids and Blood transport control systems Introduction to ANS, Excitable and contractile Cells.

**PHS 212: BLOOD AND BODY FLUID PHYSIOLOGY 2-0-3 (2 Credits)**

Introduction and definition of body fluids and body third compartments Regulation of body fluid volumes. Physiological variation of body fluid volumes. Techniques for quantifying various body fluid volumes. Blood: Functions of blood and classification of blood cells, Erythropoiesis, Haematological indices. Haemoglobin genotype and Blood groups, Immunology and cell defence.

**PHS 213: CARDIOVASCULAR SYSTEM 2-0-0 (2 Credits)**

Defination and functions of the cardiovascular system, Cardiac, muscle cardiac myoelectrophysiology, cardiac cycle, circulation of blood, cardiac output and regulation. Blood pressure, Haemodynamics and microcirculation, Pulmonary, Cerebral, Coronary, splanchnic and muscle circulation. Shock and cardiovascular changes in exercise.

**PHS 214 RESPIRATORY PHYSIOLOGY 2-0-0 (2 Credits)**

Definition and functions of the respiratory system, Physiologic anatomy of the respiratory system. Respiratory dynamics and work pulmonary ventilation: Lung volumes and capacities, Spirometry.. Mechanism and mechanism of breathing, Lung surfactant, pulmonary circulation. Gas exchange and gas transport. Oxygen-Haemoglobin dissociation curve. Hypoxia and dyspnoea. Respiratory changes in exercise and barometric changes. Control of breathing.

**MBC 210: INTRODUCTORY BIOCHEMISTRY 2-0-0 (2 Credits)**

Short history and definition of Biochemistry: Importance of Biochemistry to medicine and other scientific disciplines. The living cell. Organization and Molecular architecture. Types of cell and their characteristics. Structure and organization of Biological membranes Biomolecules and the origin of life. Chemistry of biomolecules. Carbohydrates Classification, structure distribution and functional role of named examples. Chemical properties and reactions. Essential fatty acids, Eicosanoids fat-soluble vitamins – Structure and functions. Peptide bonds and hierarchy of protein structure Nucleic acids. RNA and DNA Structure/function of enzymes, Zymogens. Active site and specificity of enzymes. Inhibition and “Activation of enzymes. Factors affecting enzyme catalase reaction. Allosteric enzymes, isoenzymes. The Concepts of Vitaminoses, Hypovitaminoses and Antivitamins. Vitamins and their co-enzyme function. Biomedical importance of vitamins.

**ANT220: GROSS ANATOMY OF THE ABDOMEN, PELVIS AND PERINEUM 2-0-3 (2 Credits)**

Abdomen: subdivision of the abdominal region and their applied anatomy, Anterior Abdominal wall, inguinal region, posterior abdominal wall, stomach, spleen, liver, gall bladder, pancreas, small and large intestine, celiac trunk, biliary apparatus, intra and supra colic compartment and recesses, appendix, renal and suprarenal gland, dissection of the entire abdominal region for proper understanding of the entire region. Pelvis and perineum:

Pelvic cavity wall and diaphragm. Pelvic visceral like the urinary bladder, uterus, testes, ovary, etc. Perineum, boundaries and subdivisions. Perineal pouches, external genitalia, ischiorectal fossas. General dissection of the pelvis and perineum region.

**ANT 222: SYSTEMIC HISTOLOGY I 2-0-3 (3 Credits)**

Systemic histology of CVS, GIT, Musculo skeletal

**ANT 223: SYSTEMIC EMBRYOLOGY 1 2-0-3 (3 Credits)**

The diaphragm, the cardiovascular, respiratory and gastro intestines systems. Development of the adrenal gland, the liver, the pancreas and the spleen. The urogenital, Musculo-skeletal and integumentary system. The limbs, the molecular regulation and associated developmental anomalies of the systems.

**MLS 222: INTRODUCTION TO MEDICAL LABORATORY SCIENCES 11 2-0-1(2 Credit)**

Microcopy and micrometry-use and care of microscopes. Refrigeration and freeze-dries-principles, uses, care and maintenance. Handling, of laboratory animals. Laboratory location and floor plan. Laboratory organization and management. Simple analytical techniques in chemical pathology. Presentation of volumetric analysis. Urinalysis etc, principles of tissues preservation; fixation, processing and staining. Handling of surgical autopsy specimens . Removal of formal in pigments, basic, tools of the microbiologist-wire loop cotton wool, pipettes, swab and their uses, preparation of films and basic staining techniques Gram’s stain, Ziehl Nelson’s stain. Hematological stain principle and components. Blood film preparation and staining, pipettes, chambers care and uses. Haemoglobin, PCV estimation, WBC counting.

**PHS 221: RENAL PHYSIOLOGY 2-0-0 (2 Credits)**

Definition and functions of the kidney. Physiologic anatomy of the kidney, Glomerular filtration. Tubular functions, Urine formation:- Dilute and concentrated. Urine, counter current mechanism, Plasma clearance, renal autoregulation, ECF regulation, Acid Based balance, Renin-Angiotensin system.

**PHS 222: GASTROINTESTINAL PHYSIOLOGY 2-0-3  
(3 Credits)**

Definition and functions, Physiologic anatomy and innervations of the GIT, Mastication, Deglutition, Salivary gland, Digestion and food absorption, Movement and Stomach emptying, Movements of the GIT, Vomiting and defecation, GIT secretions and juices, Liver and General metabolism (BMR).

**PHS 223: ENDOCRINOLOGY AND REPRODUCTION 2-0-0  
(2 Credits)**

Definition and functions, Definition of Hormones, Methods of Measurement, Types and mechanism of Actions, Regulation, Physiologic, anatomy, Hypothalamus, Hypothalamic releasing factors, Hypothalamic Nuclei, Hypothalamo-hypophyseal system, Pituitary gland, Tropic Hormones, GIT and other Local Hormones. Structure and functions of male and female reproductive organs. Androgens, Spermatogenesis and fertility. Infertility in male. ogenesis, Sexual cycle and hormonal regulations. Fertilization, Pregnancy and Parturition, Fertility and infertility in female. Family planning.

**PHS 224: TEMPERATURE REGULATION (1 Credit)**

Body temperature and the environment, Mechanisms of heat Exchange, peripheral, thermoreceptors, central thermoreceptors, hyperthermia, and hypothermia, Fever, heat Exhaustion and Heat stroke.

**MBC 220: CARBOHYDRATE AND LIPID METABOLISM 2-0-3  
(3 Credits)**

Structural inter-relationships of sugars. Stereochemistry of sugars. Hexoses, Pentoses, Disaccharides, Starch, Glycogen and Polysaccharides. Methods of identifying sugars. Carbohydrate metabolism. Digestion and absorption. Glycolysis. TCA cycle and Pentose Phosphate Pathway. Glyoxylate Pathway. Gluconeogenesis and Glycogenesis. Mitochondrial Electron Transport Chain and Oxidative Phosphorylation. Energy generation and storage in Biological Systems.

Disorders of Carbohydrate Metabolism. The Pyruvate and  $\alpha$ -Ketoglutarate complexes and their regulation. Metabolism of Lipids. Digestion and absorption. Role of Lipoproteins in lipid transport. Metabolism of lipoprotein in health and disease. Triacylglycerol oxidation and oxidation of fatty acids. Storage and mobilization of energy stores in adipocytes. Ketone bodies and Ketosis.

Interrelationship of fatty acid and carbohydrate biosynthesis/oxidation. Biological importance of Eicosanoids. Glycolipids and Sphingolipids. The Chemistry and metabolism of Steroids and Steroid hormones.

**MBC 223 AMINO ACID AND PROTEIN METABOLISM 2-0-3  
(3 Credits)**

Structure of amino acids. Peptide bonds. Metabolism and transport of amino acids and proteins. Digestion and absorption. Gammaglutamyl Cycle. Detailed treatment of mechanism of deamination, transamination. Glutamate Dehydrogenase, Glutamate and Glutamine synthesis. The biochemical and clinical importance of these enzymes. Fate of Carbon skeleton. Urea cycle. The concepts of Nitrogen balance. Nitrogen turnover in cells. Degradation of amino acids. Aromatic acids degradation, inborn errors of metabolism, metabolism of Uric Acid. Integration and Compartmentation in intermediary metabolism. Metabolism of one carbon compounds.

**MBC 225 PROTEIN CHEMISTRY AND ENZYMOLOGY 2-0-3**

(3 Credits)

A review of the Structural Characteristics of proteins. Determination of N and C terminal amino acids. Amino acid sequence and sulphide bridges. Determination of Protein Structure by X-Crystallography. Biological functions of proteins. The oxygen transporting proteins (Haemoglobin and Myoglobin). Connective tissue proteins. Collagen and Elastin. Structure/Function relationships.

Enzymes. Isolation and Purification from animals and plants and micro organisms. Zymogens and Isoenzymes. Characteristics of enzymes. Kinetics of enzymes catalysed reaction. Allosterism. Importance of Enzymology in Medicine. Coenzymes and relationships to vitamins.

**300 LEVEL**

**MLS 310 LABORATORY POSTING 1 (SIWES) 0-1-6 (3 Credits)**

Posting of students to all sections of routine medical laboratories for on the job training under the supervision of qualified medical laboratory scientists for 2 days weekly for the entire semester. Scored log books are kept by each student per posting.

**MLS 311 MEDICAL LABORATORY SCIENCE ETHICS**

(3 credits)

History and philosophy of ethics in the practice of Medical Laboratory Science. Relationship between religion and socio-cultural values on medical ethics. Ethical issues involved in private practice. Relationship between the Medical laboratory scientist and other members of the health team. Intra professional auditing, Medical laboratory Sciences ethic and 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, and sexually transmitted disease etc. real case presentation medico—legal aspects of medical Laboratory practice

100

**MLS 312 INTRODUCTION TO MEDICAL LABORATORY SCIENCE III 2-0-0 (3 Credits)**

Introduction to, parasitism, and other animal associations, adaptation to parasitic way of life. How parasites invade their host. The ineffective agents of parasites. Basic knowledge of structure, classification and life cycle of parasites of medical importance, vectors and intermediate hosts of parasites. Introduction to arthropods of medical importance. Biology of the mosquito in relation to the transmission of malaria, filariasis and viral infections.

**MLS 313 MEDICAL PHYSICS 2-0-3 (3 Credits)**

Kinematical and mathematical problems—circulation of pulse, blood pressure and volume changes. The heart and blood surface tension effect. 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 314 BASIC CLINICAL CHEMISTRY 2-0-3 (3 Credits)**

Traditional and S. 1 units in clinical chemistry; Reference values: Gastric function test; Agents for Gastric stimulation. Ward procedures and laboratory investigation of Gastric secretion: Intestinal function tests; Digestion and absorption; cause of Malabsorption. Laboratory investigation of malabsorption. Renal functions of the kidney; measurement of Renal plasma flow, Glomerular filtration rate. Creatinine clearance, insulin clearance, concentration and dilution tests; urinary, acidification tests, urine specific gravity/Osmolarity. Dye Excretion test. Water and Electrolyte status. Blood buffers. Transport of blood gases; assessment of acid/base status. Lipids; definition and types of lipids; formation of free fatty acids, Ketone bodies and lactate; measurement of plasma lipids and lipoprotein. Plasma proteins and physiology functions; factors affecting synthesis and catabolism. Methods for the determining of total protein in serum.

101

Carbohydrate metabolism; blood glucose homeostasis, Hyperglycemia diabetes mellitus-its cause and investigation: Hypoglycemia—types causes and investigation.

**CED 300: INTRODUCTION TO THEORY AND PRACTICE OF ENTREPRENEURSHIP 2-0-0 (2 Credits)**

Introduction to entrepreneurship, ways of starting a business, conducting market Surveys etc. Legal procedures for starting an entrepreneur and the Law, Financing, Marketing, Record and record keeping, business planning.

**MLS 315 BASIC IMMUNOLOGY 2-0-0 (2 Credits)**

The Historical background of Immunology. Classification of Immunity Innate Immunity. Development and structure of cells in the Immune system. Cellular interaction in the expression and regulation of immunity acquired.

**MLS 321 INTRODUCTORY MICROBIOLOGY 2-0-0 (2 Credits)**

History, Morphology, growth and nutrition. Classification and identification of bacteria. Bacterial genetics, Bacteriophages, viruses, infection and resistance to infection. Sterilization and disinfection. Antimicrobial agents. Introduction to parasites and fungi.

**MLS 322 LABORATORY INSTRUMENTATION & TECHNIQUES 3-0- 2 (3Credit)**

Instrument aspects of qualitative and quantitative analysis-theory and practice of some common analytical techniques; colorimetry, spectrophotometry flame- photometry, conductometry, polarography etc. Osmometry, nephelometry, Turbidimetry, PH measurement by ion specific electrodes—separation techniques including Electrophoresis; paper, cellulose acetate, Agar gel starch and polyacrylamide gel; Isoelectric focusing, Isotophoresis, Chromatography, Ion exchange, Gel

filtration, molecular sieves; dialysis filtration, solvent Extraction, centrifugation –Ultracentrifugation, Immuno-electrophoretic techniques, radio immunoassay, competitive protein binding, Isotope dilution techniques; Enzyme Immuno assay, receptor Assay, automation, Micro and Ultra Micro Analysis. Practical based on the above topics.

**MLS 326 SUPPLY CHAIN MANAGEMENT 2-0-0 (2Credits)**

Laboratory Management, planning a medical laboratory including the provision for the reception of patients selection and storage of chemicals, materials and apparatus. Detailed knowledge of the principles, use and maintenance of common laboratory apparatus and equipment. Ventilation, air conditioning and dust control in the laboratory. Equipment used in special workbench e.g cutting—up benches media-pouring, etc sterilization of air. Laboratory hazards and safety measures to be taken in the use of radioactive and dangerous materials. Emergency treatment for accidents. Laboratory Records Maintenance of records: reception, recording storage, filling and indexing of specimens and result. Organization and operation of a system of quality control. Supply Chain Management: Introduction to commodity supplies, SOP Manual for facilities and staff in SCM, Cataloging and Indexing of Laboratory supplies, Introduction to LMIS, Max-Min, Inventory control system, Adjust Max-Min level. Inventory, storage and distribution of health commodities, Assessing health logistics, system selection, quantification of Medical laboratory and Health commodities, Supply, Planning and Shipment. Introduction to Medical Laboratory commodities procurement, monitoring and supervision. Methods of recording experiments.

**MLS 323 FUNDAMENTAL BLOOD TRANSFUSION SCIENCE 2-0-3**  
**(3 Credits)**

ABO and Rhesus Blood Groups, Inheritance, distribution and Genetic Theory. Blood Grouping Techniques –principles, Disadvantages and Advantages. Preparation of Antisera, Antiserum titration avidity, potency and specificity. Plant lectins—preparation and standardization of antisera from lectins e.g Dolochos biflorus. Anticoagulants used in BGS; ACD, CPD-CPA-A etc in modes of action and side effects. Blood bottles (MRC) and plastic Bags-Advantages and disadvantages. Donor screening—using CUSO<sub>4</sub> method –other methods of screening. Preparation of blood products—cryoprecipitate, platelet rich plasma, packed cells fresh frozen plasma, fibrinogen etc. storage of blood and blood products- various methods, advantages and disadvantages. Blood banking –organization structures, facilities and records. Blood group specific substance – synthesis, identification method (s) and application. Quality control of physical and chemical reagents. Practical/Tutorials. ABO and Rhesus grouping method Antiserum Titration DCT and ICT antibody screening.

**MLS 324 BASIC HAEMATOLOGY 2-0-3 (3 Credits)**

Origin, development and function of blood cells. Synthesis and breakdown of haemoglobin. Methods of Haemoglobin estimation. Methods of cell counting. Absolute values. Introduction to Homeostasis. Principles and mode of action of common anticoagulants. Principle and components of Hematological stains. Simple tests used in blood coagulation. Blood films –normal and abnormal practical classes.

**MLS 325 GENERAL PATHOLOGY (BASIC HISTOPATHOLOGY) 2-0-3**  
**(3 Credits)**

Introduction to Histopathology, fixation autolysis bacterial decomposition. Effects of fixation, common fixing agents and their uses. Secondary fixation, post –fixation and post –chroming and post mordanting. Fixation, pigments Decalcification. Dehydration, clearing and infiltration/embedding. Frozen and

celloidin sections. Embedding media. Basic histology of organs. Principles and application of exfoliative Cytology. Collection and fixation of specimens for Cytological examination. Museum technique- colour restoration. Mounting in museum jars. Tissues and cellular injury inflammation. Healing and repairs. Gross post-mortem slide examination to illustrate normal and abnormal features appearance of diseased organs in routine and common tumours.

**PCO 320 INTRODUCTORY PHARMACOLOGY 2-0-3 (2 Credits)**

History of Pharmacology and its development. Introduction to pharmacokinetic; drug absorption and bioavailability. Drug metabolism, pharmacogenetics. Effects of disease on drug kinetics. Drug in pregnancy and the extreme age. Pharmacodynamics; dose-response relationships, LD<sub>50</sub>, ED<sub>50</sub> and Therapeutic index; introduction of new drugs, clinical trials; adverse drug reactions and adverse reaction surveillance.

**MLS 320 LABORATORY POSTING II (SIWES) 0-1-6 (3 credits)**

Posting of students to all section of routing Medical laboratories for on the job training under the supervision of qualified medical laboratory scientist for 2 days per week scored logbook records per bench are kept for each student per posting.

**400 LEVELS**

**MLS 411 MEDICAL PARASITOLOGY AND ENTOMOLOGY**  
**2-0-3**

(3 credits)

Introduction to the parasites. Classification of protozoa, (the amoebas, the ciliates, the flagellates, Nematodes. (Ascaris, Strongyloidies, Trichuris, Guinea worms, Trichinella Enterobius, etc.). Life cycle and pathogenicity of cestodes. (The tapeworms, Larval forms of Cestodes). Life cycle and pathogenicity of the Trematodes (The Schistosome, fasciola paragonimus, etc.). methods of demonstration of parasite in blood, faces,

vagina,urine urethra, pus from lung 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. Life history as disease vectors various disease of medical importance transmissible by insects. Biology of mosquito in relation to transmission of malarial, filariasis and viral infections etc.

**MLS 412 BASIC MEDICAL BACTERIOLOGY AND MYCOLOGY  
2-0-3 (3 Credits)**

Methods for the demonstration of bacterial form 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 test and chemotherapy. Plate reading. Principle and techniques of anaerobic bacteriology. 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.

**MLS 413 INTRODUCTION TO HAEMOGLOBIN,  
HAEMOGLOBINOPATHY & MYELOPROLIFERATIONS  
2-0-3 (3 Credits)**

Iron metabolism, folate and Vit B 12 metabolism, Nomenclature, classification and investigation of common haemoglobinopathies, hemolytic anemia's; myeloproliferative disorder; homeostasis and disorder of homeostasis; investigation of bleeding disorders. Bone marrow. Practical classes.

**MLS 414 INTRODUCTION TO BLOOD GROUP SYSTEMS &  
COMPATIBILITY TESTS 2-0-3 (3 credits)**

Blood groups –other blood groups e.g MNS, Duffy, Kell, Kidd etc. grouping techniques and antibody screening, clinical significance, serostatus. Antenatal serology – screening and Titration (quantitation) compatibility procedures-different methods, advantage and disadvantages, Blood Transfusion reactions.-causes and types; investigation. Risks attendant in blood transfusion- Diseases, anaphylactic, hemolytic and allergic reactions. Screening of Donor blood for diseases. Compatibility procedures- advantages and disadvantages. Practical based on the above topics.

**MLS 415 ANALYTICAL CHEMISTRY 2-0-3 (3 credits)**

Principles of analytical techniques in clinical chemistry-devising new techniques, biological trials 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, lipid, trace elements, non-protein nitrogen, volumetric analysis -partition, adsorption, 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.

**MLS 416 INTRODUCTION TO CYTOLOGY 2-0-0  
(2 Credits)**

Collection, selection and preparation of cytology specimens (Cervical smear, Vaginal smear, Bronchial aspirates, ascitic fluids and other fluids). Cytology staining techniques, normal, atypical and malignant cells. Cornification index. Maturation index, progesterone/androgen effects.

**MLS 410 LABORATORY POSTING III (SWIES) 0-1-6** (3 Credits)  
Posting of students to all sections of routine Medical Laboratories for on the job training under the supervision of qualified Medical Laboratory Scientists, for 2 days per week in the entire semester. Scored logbook records per bench are kept for each student per posting.

**MLS 417 NUCLEIC ACID BIOCHEMISTRY AND BASIC CONCEPTS OF MOLECULAR BIOLOGY 2-0-0** (2 Credits)  
Nomenclature of bases, nucleosides and nucleotides. Nucleic acids. Hydrolysis of nucleic acids. Analysis of nucleotide sequence in nucleic acids and its application in diagnosis of diseases. Nucleic acid protein complexes. Genetic role, structure and replication of DNA. Introduction to polymerase chain reaction and its application in laboratory diagnosis.

**MLS 421 BIOSTATISTICS 2-0-0** (2 Credits)  
Aims, characteristics and application of biostatistics in biomedical sciences- samples, population variables, frequency distribution, vital and descriptive statistics, measurement of central tendencies – mean, median, mode dispersion, standard deviation and coefficient 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.

**MLS 422 VIROLOGY 2-0-3** (3 Credits)  
Morphology and life cycle of viruses, nomenclature and classification of viruses –various methods. Reproduction and multiplication of viruses, resistance, pathology, collection of clinical specimens for viral culture. Culture methods for isolation of viruses, purification, immunity, laboratory diagnosis of viral infection. Haemagglutination test, CFT, Neutralization test, systematic study of viral diseases. Interferon, immunotherapy and chemotherapy in viral infection, inclusion bodies and cytopathic

effects. Viral and host interactions and identifications, Viral vaccines and immunoprophylaxis.

**MLS 423 INTRODUCTION TO HISTOPATHOLOGY TECHNIQUES AND MUSEUM 2-0-3** (3 credits)  
Principle of photochemical methods. DNA- demonstration by Feulgen techniques. Silver impregnation methods. Genes and genetic code. Tissue culture techniques; chromosome analysis. Autoradiography – Definition and principle. Organization of a medical Museum. Method of colour maintenance. Fixation and storage of museum specimens. Special museum techniques e.g Dawson's Method. Principle of photography-Macro and Microphotography. Preparation of stained sections for microphotography. Preparation of specimens for macro photography. Cytological normal cells. Histology of tissues. Atypical and malignant cells. Collection of cytological smears and processing and screening. Principles of general pathology. Systemic pathology. Gastrointestinal tract. Urogenital, coetaneous. Principle of electron microscopy. Practical based on the topics.

**MLS 424 BIOMEDICAL ENGINEERING 2-0-0** (2 Credits)  
Workshop practice. Principles of use, maintenance and repair of common apparatus and laboratory equipment. Principle of applied and general electronics. Circuit diagrams computer programming. Improvisation. Glass blowing and construction of simple laboratory equipment. Design techniques, improvement on existing equipment, review and modifications of laboratory methods.

**MLS 425 BIOTECHNOLOGY AND BIOINFORMATICS 2-0-3** (2 Credits)  
General preparation and storage of reagents for diagnostic use. Preparation and purification of antibody and antigen for diagnostic tools. Monoclonal and polyclonal antibodies. Concepts of vaccination. Preparation, purification and storage of vaccine. Introduction to Mathematical and Computation

Genomics. Its application to medicine in general and laboratory diagnosis specifically.

**MLS 426 COUNSELING/SKILLS 2-0-0** (3 Credits)

Definition of counseling, care and support, types of counseling pre-test, post-test prevention primary or secondary, crisis management, problem solving, decision making couple spiritual and pastoral; who needs counseling Prospect/benefits of counseling constraints in counseling, rewarding listening skills, prevention and managing conflicts. Genetic counseling including sickle cell trait in marriage, Blood donation campaign HIV infection etc. Case studies.

**MLS 427 IMMUNOLOGY/IMMUNOCHEMISTRY 2-0-3** (2 credits)

Immunoglobulin-Structure and infection. Gene Organization and assembly. Mediators of cellular Immunity. Phagocytic cell-Chemotaxis and effectors function of Macrophage and Granulocytes. The complement system. Laboratory methods of detection of antigens and antibodies. Autoimmunity, Tissue and Graft reactions Immunotolerance, self and nonself, Histocompatibility, Transplantation, Tumor Immunology, Hypersensitivity and allergy.

**MLS 420 LABORATORY POSTING IV (SIWES) 0-1-6** (3 Credits)

2 days weekly for the entire semester. Scored log books are kept by each student per posting.

**500 LEVEL**

**GENERAL COURSES FOR ALL THE CANDIDATES**

**FIRST SEMESTER**

**MLS 510 LABORATORY POSTING V (SIWES) 0-1-6 (3 CREDITS)**

Each student undergoes on the bench training in the different analytical techniques used in the area of specialization. The students are to participate in the routine operation of the laboratory. Log books are kept by each student under the supervision of a qualified medical laboratory scientists.

**MLS 511 SEMINAR 0-2-0** (2 CREDITS)

Students are to carry out intensive literature research and present seminar on selected approved topics to the Departmental colloquium. Each presentation will be for about 15 to 20 minutes followed by general discussion. The presentation will be scored by the group of internal assessors appointed by the department.

**MLS 512 RESEARCH METHODOLOGY 3-0-0** (3 Credits)

Introduction to research methodology. Collection of literature review articles. Problem definition. Sampling techniques. Experimental designs of medical and data public health studies. Questionnaire design and data collection analysis. Interpretation and utilization of research findings. The role of research in health and social welfare. The need for institutional and governmental ethical clearance for some research Aims, characteristics and application of biostatistics. Measures of central tendencies and variation. Collection and presentation of data. Probability sampling. Test of statistical. Significance. Experimental designs and clinical trials. Other applications of biostatistics to clinical and preventive medicine projects. Research proposals and sourcing of funding for research projects. Arts of scholarly publications, and instructional design

**MLS 513 CYTOGENETIC 2-0-0** (2 Credits)

Theory and practice of clinical cytogenetics. Chromosome analysis, structure, organization and staining techniques. Chromosomes in man Normal karyotype and chromosome abnormalities. Mosaicism, trisomy, monosomy, translocation Klinefelters and Turner's syndromes, sex chromatin. Inactivation of X -chromosome and sex determination. Genetic diseases. Clones, mapping of autosomes, DNA synthesis, gene in kindred segregation. X-linked inheritance. Chimeras. Genes in families and population. Selection, pedigree analysis, mutation and mutagens, Hardy Weinberg equation, genetic drift, inbreed. Slide reporting. Philadelphia and Christ church chromosomes.

## SECOND SEMESTER

### **MLS 520 LABORATORY POSTING VI (SIWES) 0-1-6 (3 CREDITS)**

Each student undergoes on the bench training in the different analytical techniques used in the area of specialization. The students are to participate in the routine operation of the laboratory. Log books are kept by each student under the supervision of a qualified medical laboratory scientists.

### **MLS 521 GENETICS AND MOLECULAR BIOLOGY 3-0-0 (2 Credits)**

Genomic Gene purification and amplification, polymerase chain reaction technique. Construction of genetic maps. Biotechnology – recombinant DNA, Hybridoma.

### **MLS 522 PROJECT 0-0-8 (6 Credits)**

A supervised research project on an approved topic to be undertaken by each student for the partial fulfillment of the BMLS degree requirement. Assessment of the project will be by both oral defense and grading of the project content.

## **CLINICAL CHEMISTRY SPECIALTY**

### **MLS 531 CARBOHYDRATE, PROTEIN AND LIPID METABOLISM 2-0-3 (3 Credits)**

Carbohydrate metabolism and disorder. Pathophysiology of diabetes mellitus. Diabetic ketoacidosis, Hyperosmolar non ketotic coma, lactic acidosis, Glycogen storage diseases. Insulinoma. Diagnostic criteria and Laboratory investigation. Fasting Plasma glucose, random plasma glucose, glucose tolerant test, pancreatic hormones and glycosylated hemoglobin. Lipid lipoproteins and apoproteins structure, composition and function, Intravascular metabolism and catabolism of lipoproteins. Disorders of lipid and lipoproteins. Lipid storage diseases. Cardiovascular function test. Recent advance in diagnosis of lipids disorders. Plasma proteins in health and diseases. Definition, cause and investigation of Para

protein; Bence Jones proteinuria) and significance. Fractionalization of proteins. Protein electrophoresis in health and diseases. Protein degradation. Metabolic disorder and regulation of amino acid metabolism.

### **MLS 532 Renal, Liver & Neuro-Chemistry 2-0-3 (3 Credits)**

Physiology of kidney, renal clearance and glomerular filtration rate. Renal plasma flow, maximal tubular excretory and reabsorptive capacity. Urea, creatinine and insulin clearance. Concentration and dilution tests. Renal failure, azotaemia, anuria, sodium loss in renal diseases. Aminoaciduria. Kidney diseases and kidney function test. Urinalysis in health and diseases. Features of hypernatraemia and hyponatraemia. Investigation of water and electrolyte imbalance. Homeostasis in clinical chemistry. Acid-base balance.

The liver anatomy and physiology-an overview. Biosynthesis of bilirubin, excretion of bile pigments. Jaundice anatomical and physiological classification. Pigment excretion in jaundice. Liver diseases and liver functions test to include congo red test for amyloids and faecal fat estimation. Biochemistry of Neoplastic disorders. Diseases of the nervous system. Basic neurochemistry, CSF –normal composition and changes in diseases. Diseases of muscles.

### **MLS 533 CLINICAL ENZYMOLOGY 2-0-3 (3 Credits)**

Mechanics of Enzyme action and kinetics, Activation repression phenomenon. Enzyme induction, inhibition, purification and specificity. Clinical Enzymology; Coenzymes and Isoenzymes in medicine, diagnosis importance of isoenzymes in biotechnology.

### **MLS 534 NUTRITION AND CLINICAL VITAMINOLOGY 2-0-0 (2**

Credits) Vitamins History and biochemical functions. Chemistry and metabolism of water and fats soluble vitamins. Their deficiency states and physiological significance. Relationship with hormones. Vitamin in health and diseases. Methods of analysis. Trace elements-Bioavailability, biochemical function, metabolism, and interaction. Hormonal control and methods of

analysis. Specific elements in health and diseases. Bone diseases and investigation of bone disorders. Types, causes ETC. Causes and Investigation of nutritional disorders.

**MLS 535 DRUG MONITORING, TOXICOLOGY AND INBORN ERROR OF METABOLISM 2-0-3 (3 Credits)**

Introduction to assimilation, distribution, elimination and excretion of drugs. Practical and theoretical aspect of poisoning. Investigation of suspected cases of poisoning. Estimation of blood alcohol, Salicylate sulphamide, cyanide, oxygen, CO<sub>2</sub>, ammonia and Detection of barbiturate, cocaine heroin, opium, phenothiazine, methaqualone etc in blood, urine, sweat, aspirates, etc. Porphyrin, causes, symptoms and laboratory investigation of porphyriaemia, porphyria and porphyrinuria. Haemoglobin, synthesis, Chemistry of Haemoglobinopathies, Sulp Hb, CoHb, Met Hb. Definition, causes, consequences and investigation of some inborn errors of metabolism; Phenylketonuria, galactosemia fructose intolerance, Albinism, aminoaciduria.

**MLS 536 CLINICAL AND REPRODUCTIVE ENDOCRINOLOGY 2-0-3 (3 Credits)**

Endocrine glands-organization. Cellular communication by endocrine glands. Endocrine receptor binding control of endocrine action. Endocrine glands functions; the hypothalamus, the pituitary, the parathyroid, adrenal cortex, adrenal medulla. The gonads and reproductive endocrinology. Foeto-placental function. Endocrine control of metabolism and endocrine diseases/disorder; water balance, insulin action thyroid hormone and reproduction. Investigation of male and female infertility.

**MLS 537 TECHNIQUES IN CLINICAL CHEMISTRY 2-0-3 (3 Credits)**

Analytical techniques, standardization and quality control. Validation of assay. Birth of a new method, devising new techniques. Biological trial and tests for acceptability. Solid/dry phase chemistry. Dipstick technology, thin film technology. Immobilized enzymes. Functional test in clinical chemistry. Liver

function test. Renal function test. Gastro intestinal function test etc. Analytical techniques employed in qualitative and quantitative. Determination of (1) Enzymes-phosphates. Transaminases, Dehydrogenases, kinases(2) Hormones (3) protein-Total proteins, Albumin and globulin specific protein (4) Lipids-cholesterol, triglycerides glycerol, fatty acids and lipoproteins. (5) Trace elements-Fe, Cu, Zn, Mg, selenium (6) Non-protein nitrogen-Urea, creatinine, uric acid, amino acids and ammonia, urinalysis, determination of urine specific gravity, osmolarity, qualitative tests for protein, glucose and reducing substances. Ketone bodies, bilirubin, urobilinogen and blood. Haemoglobin and haemoglobin derivative in urine. Spectroscopy of Haemoglobin and its derivative in blood and urine. Astrup techniques. Chromatography, spectroscopy, spectrophotometry and photometry, AAS, Flame Photometer, (AES), Radioimmunoassay, ELISA and EIA.

**HAEMATOLOGY AND BLOOD TRANSFUSION SCIENCE SPECIALITY  
MLS 541 HAEMOPOIESIS, HAEMOGLOBIN,  
HAEMOGLOBINOPATHIES & YELOPROLIFERATIONS  
2-0-3 (3 Credits)**

Erythropoiesis and blood. Blood cell counts in health and diseases. Blood indices. Anaemias, disorders of Iron metabolism, vitamin B12 and Folate deficiencies, Haemochromatosis and related storage disorders. The spleen and splenomegaly syndromes. Drugs, chemical and the blood Haemoglobinopathy, Haemoglobin genotype and phenotype.

Blood in infancy, childhood and pregnancy, Hereditary and blood disorders. Blood in microbial infections. Identification of blood parasites Immunohaematological disorders, autoimmune diseases, thrombocytopenia, leucopenia, Leukemia systemic and disseminated lupus erythematosus, rheumatoid arthritis myelomatosis and order paraproteinaemia. Preparation and cytology of blood and bone marrow films in health and disease.

**MLS 542 BLOOD GROUP SYSTEMS AND COMPATIBILITY TESTS2-0-3 (3Credits)**

ABO and other blood groups- MNS, KELL, Kidd, Duffy, Lewis, p-1 etc. Antenatal Serology; Hemolytic diseases of the newborn. Type, etiology, antenatal and post natal management. Blood group serology in paternity dispute. Haemolysin titration. Absorption and elution techniques. Indication and complication of blood transfusion. Red cell survival tests— radioisotope and differential agglutination methods. Screening of blood donor for infective agents – HIV, HBV, malaria, filarial, trypanosomes, syphilis, etc. anonymous result in blood grouping. False positive and false negative result in compatibility testing. Preparation and standardization of AHG.

**MLS 543 SEROLOGY AND BLOOD TRANSFUSION SCIENCE 2-0-3 (3 Credits)**

Leucocytes and platelet antigen and antibody. Auto-immunization IgM, IgG, IgA antibodies. National Blood Transfusion Service. Preparation of commercial quantities of polyclonal antisera. Principles, uses and techniques of producing monoclonal and polyclonal antibodies. Types of blood substitutes and preservations. Preparations of blood products. WHO standards in BGS. Red cells membrane structure in relation to blood antigen locations.

**MLS 544 ADVANCED HAEMATOLOGICAL TECHNIQUES 2-0-3 (3Credits)**

Principles and techniques of Isoelectric focusing. Protein separation of column chromatography. Finger printing, principles and techniques. Purification of proteins and enzymes. Ultracentrifugation and molecular weight determination. Culture of blood cells and parasite. Leukocyte typing platelet aggregation- principles and techniques. Radioisotopes in Haematology; Isotope labeling techniques, measurement of radioactivity Fluorescent antibody techniques. Radioimmunoassay, ELISA, western blotting immunoelectrophoresis, competitive protein binding. Automation

in Haematology, Electrophoresis- starch agar gel and polyacrilamide gel and polyacrilamide gel. Principle of polymerase chain reaction. Cytochemical procedurces. Lymphocyte Transformation Tests. Paul—Bunnel. test.

**MLS 545 ADVANCED BLOOD GROUP SEROLOGY TECHNIQUES 2-0-3 (3 Credits)**

Techniques for emergency compatibility testing – low ionic sucrose solution, spin coomb's albumin special compatibility techniques Exchange and extracorporeal blood transfusion. Preparation of enzymes used in BGS. Forensic application of BGS, Two stage Coomb's technique Automation in BGS- Group and cross matchings Techniques, autoanalysers for antibodies and antigen detection and identification, etc.

**MLS 546 COAGULATION AND FIBRINOLYSIS STUDIES 2-0-3 (3 Credits)**

Platelet functions, normal and abnormal haemostasis, measurement of bleeding time. Vascular integrity. Coagulation factors, Assessment of coagulation time. One stage prothrombin time, "Thrombotest" Thromboplastin generation. Haemophilia state, assay of anti-haemophilic factor (VIII), recalcification time. Fibrinolytic activities, rapid demonstration of fibrinogen deficiency. Simple assessment of fibrinolysis. General Principles underlying clotting factor assay and measurement of fibrinolytic activity. Platelet substitute solutions. Fibrin plates. Control of anticoagulant therapy.

**HISTOPATHOLOGY SPECIALTY**

**MLS 551 FUNDAMENTAL HISTOPATHOLOGY 2-0-3 (3 Credits)**

Fixation: Purpose and effect of fixative composition and uses of fixatives and their respective action on tissue components. Microscopic appearance of tissues after various methods of fixation. Function and scope of secondary fixation , post fixation and post mordantings. Knowledge of fixation of tissues for histochemical methods to include freeze drying and freeze drying

substitutes. Decalcification - processing techniques - paraffin wax, embedding media for mechanical and manual processing. Microtomy - Microtomes (manipulation and uses of rocking, rotary, sledge, freezing, cryostat and ultra microtomes), knives - selection and maintenance for various microtomes, manual and mechanical sharpening. Section cutting (techniques used with different embedding media, attachment of sections to slides-frozen section techniques method for rapid diagnosis.

**MLS 552 SYSTEMIC HISTOPATHOLOGY 2-0-3 (3 Credits)**

This course exposes the students more into general pathology, control of results and management of Histopathology laboratory. More facts of Electron microscopy and Autoradiography are highlighted. Principles of general pathology applied to individual organs. Systemic Pathology. Hypertensive heart disease, heart failure and cardiomyopathies. Respiratory - Tuberculosis, pneumonia, Nephropathy associated with infestations and infections. CNS, special senses. Malignant lymphomas (non-Hodgkins and Hodgkins lymphoma, Burkitts). Idiopathic-tropical splenomegaly syndrome. Liver -cirrhosis liver cells carcinoma. Hepatitis. Female reproductive organs -pelvic inflammatory diseases. Cancer-cervical, trophoblast, ovarian. Skin leprosy, kaposi sarcoma. Electron microscopy- preparation of materials for electron microscopy. Toxicity of some reagents used in Electron microscopy. Techniques involved in autoradiography, Laboratory Management. Quality control and automation in histopathology laboratory. Slide Reporting.

**MLS 553: HISTOCHEMISTRY AND HISIOLOGICAL TECHNIQUES 2-0-3 (Credits)**

Enzyme histochemistry and its diagnostic application. The theory of stains and application, metallic impregnation and various histochemical methods. The dye theory. Properties of natural and synthetic dyes. Composition, preparation and storage of staining reagents. Testing of reagents. Common nuclear stain and counter stain for general tissue structures. Staining methods to demonstrate elastic, connective tissues and fibers. Toxicity of

some reagents used as it applies to auto-radiography , electron microscopy and ultra microtomy. Suitable fixatives for use, processing techniques, impregnation/embedding and slide preparation /interpretation.

**MLS554 MEDICAL CYTOLOGY 2-0-3 (2 Credit)**

Study of epithelial cells. Introduction/definition of medical exfoliative cytology. Definitions and principle of exfoliative cytological methods. Gynaecological and non gynaecological cytology. Cytology of normal and malignant cells. Diagnostics criteria for all malignancy. Kinds of tumours. Methods of collection of samples for gynaecological non gynaecological. Types of fixatives used. Staining techniques applied. Hormonal evaluation/assessment . Identification of virus, parasites. Micro-organisms and fungi in smears. Slide identification/interpretations. Principle of liquid basal cytology. Usefulness and advantages, disadvantages and diagnostic application.

**MLS 555 EMBALMENT SCIENCE AND MUSEUM TECHNIQUES 2-0-3 (2 Credit)**

History and science of embalment. Formalin based embalment techniques. Other methods of preservation of dead, cryopreservation (history, procedure and applications) and mummification (history, procedure and applications). Different embalment techniques and problems. Museum mounting of whole organs, techniques, importance and application. Factors affecting embalming fluids. Setting up a mortuary/medical museum. Forensic pathology as it applies to post mortem examination, recording of pathological changes of organs and collection of clinical data during autopsy especially as it relates to drowning poisoning, strangulation e.t.c. Practical based on the above topics are advised. Dogs/goats can be used for practical exercise.

**MLS556 IMMUNOCHEMISTRY 2-0-3 (2 Credit)**

Immunohistochemistry/immunocytochemistry, basic principles, staining procedures and techniques. Peroxidase and anti

peroxidase major histocompatibility. Immunotyping of tumors, proteins and other diseases. Antibody and antigen preparation from cells and tissues. Human leucocytes antigen. Reading and interpretation of immunohistochemical/immunocytochemical stained slides. Preparation and production of immunohistochemical/immunocytological stains.

**MLS 557 STAINS AND STAINING TECHNIQUES 2-0-3** (3 Credit)  
Rapid H&E Frozen section, Grams techniques. Maccivello techniques, phloxine tetrazine, ziehl nelson, Perl's Prussian blue, schmorl's reaction, Masson Fontana, Feulgen Reaction, Giemsa, H&E, Gordon and Sweets, Haem Van Gieson, P.A.S., Jone's Mathenamine Silver, Congo Red, Verhoeff's MSB,PAS/Orange G.,Aldehyde fuchsin, Heidenhains iron haem, P.T.A.H., Alcian blue/PAS, Best's Kossa, Oil Red O., Nile blue method. Bieschosky's method, Marsland, Glee's method, papannicolaou, Barr body count, Hormonal Evaluation Gynae.

#### **MEDICAL MICROBIOLOGY SPECIALITY**

**MLS 561 SYSTEMATIC BACTERIOLOGY 2-0-3 (3 credits)**  
History of pathogenic microbiology. Normal body flora, pathogens sources of infection, laboratory diagnosis and identification of bacteria. The pyogenic cocci, (Staphi, Strep, Pneumococci and Neisseriae). The enterobacteriaceae, coliforms, gastroenteritis, salmonellosis, Shigallosis, cholera, Vibrios, Pseudomonae, Bacteriodes etc. The Haemophilic bacillus (haemophilus, Brucellae, Yersinia, Bordetella etc. Anaerobic Spore formers, Aerobic spore formers, (Bacillus, Clostridia, Spirochetes, Mycobacterium), Rickettsiae, Chlamydiae Mycoplasma, L-forms, Listeria, Erysipelothrix, Bartonella etc. General pathology, epidemiology, features, diagnosis, control and therapy anaerobiosis

**MLS 562 ADVANCED ENTOMOLOGY 2-0-3** (3 credits)  
Structure and classification of Arthropods of medical importance. Dipteral:- Families – Culicidae, Psychodidae, Siphonaptera, Ceratopogonidae, Tabanidae, Muscidae, Calliphoridae,

oestridae, Hemiptera: Families – Cimicidae, Reduviidae Anoplura: Family – Pediculidae Siphonaptera: Families – Pubicidae, Ceratophyllidae, Leptosyllidae, Tungidae Acerina:- Families- Ixodidae, Argasidae, Trombiculidac, Sarcoptidae, Demodicidae, Dermanyssidae, Porocephalidae, Linguatulidae

#### **Special Topics**

The epidemiology and geographical distribution of human diseases. Larval migrants. Group Spirochaetacea Immune reactions (serology).

**MLS 563 PUBLIC HEALTH MICROBIOLOGY 2-0-2**  
(3 credits)

General principles of microbial disease transmission – waterborne, airborne, food borne, arthropod-borne and contagious disease. Principles and techniques for water treatment, waste-water disposal. Preventive measures in the control of bacterial, parasitic and viral infections. Vaccines and immunisation. Immunisation programme and schedule (EPI).

**MLS 564 MEDICAL MYCOLOGY 2-0-3** (3 credits)

General characteristics of fungi's diseases, types of mycoses and properties; opportunistic fungi, Diagnosis and chemotherapy, Systemic mycoses (Cryptococcosis-Blastomycoses, Histoplasmosis, Coccidioidomycoses). Opportunistic mycoses (candidiasis, Phycomycoses; sporotrichoses, Chromoblastomycosis, etc.) Cutaneous mycoses-Dermatophytoses. Superficial mycoses. General properties, pathogenesis, diagnosis, epidemiology, control and recognition of fungi.

**MLS 565 MEDICAL VIROLOGY 2-2-0** (3 credits)

The dermatropic and viscerotropic viruses. Smallpox, cowpox, and vaccination; measles, rubella, chickenpox and shingles, Herpes Viruses, Yellow fever, lassa fever, Hep A, B and C, influenza, arbo viruses. The neurotropic viruses (rabies, poliomyelitis, encephalitis, Lymphocytic Choriomeningitis viruses, mumps, viral

transformation and types of tumors and viruses. Oncogen theory etc. Viral gastroenteritis, Miscellaneous, viruses, vaccines, production and immunization.

**MLS 566 PHARMACEUTICAL MICROBIOLOGY AND MICROBIAL GENETICS 2-0-3 (3 Credits)**

Principle of Antibiotics and chemotherapy. Mode of bacterial resistance to antibiotics. Sensitivity testing. Preparation of antibiogram discs. Minimum inhibitory concentration of antibiotics. History of antibiotics, mode of action, classification, antibiotics assay, use of animal model in the study of microbial infections. Evolution and inheritance mutation. Bacterial DNA in hereditary and mutation. Molecular basis of mutation, isolation of mutants. bacteriophages, plasmids, episomes, transposons and bacterial DNA transfers. Recombinant DNA technology and its applications.

**MLS 567 LABORATORY TECHNIQUES IN MICROBIOLOGY 2-0-3 (3 credits)**

Culture media (Different types, compounding from basic constituent and preparation of media). Examination, cultivation and identification of bacteria from different samples, pleural, csf, urine, sputum, ascitic fluid. Blood culture, High vaginal swab, wound swabs, ear, eye, nasal and other swabs. Stool bacteriology. Sputum bacteriology. Urine bacteriology. Systemic fungal culture and identification. Semen analysis. Special - serological tests. ASO, Widal, VDRL, Rheumatoid factor. Complement fixation, neutralization, haemagglutination tests for identification of micro-organisms. General identification of microorganisms by animal inoculation. Biochemical test for the identification of bacteria and fungi.

**DEPARTMENT OF NURSING SCIENCE  
UNIVERSITY OF BENIN**

**ACADEMIC STAFF AND THEIR QUALIFICATIONS AND RANK**

S/N	NAME	QUALIFICATION	RANK
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1	DR (Mrs) Mabel O OSIFO	PhD 1997, M.Sc 1982, PGDE 1982, BNSc.1979, RN 1975, RM 1979, RNA 1984 RNT 1986,	Lecturer In Charge of Department
2	Dr. Fidelis U. OKAFOR	PhD 2007, PGDE, M.HPM, B.Sc Nursing 1991, RNT 1991. Dip. in Opth,Nursing 1986, RN1983, Advance Dip. in Com. Ophthalmic Nursing 2006	Lecturer I
3	Dr. (Mrs.) F.O. ADEYEMO	PhD. 2004 M.Sc 1995, B. Sc. 1984, RN 1979, R.M. 1986 RNT. 1985, RPHN 2005 Fip Cert. OHN FWACN	Senior Lecturer
4	Dr.(Mrs) T.O. FILANI	PhD, M.Ed, BSc(N) 1985, 1979, 1973 RNT RN RM 1973 1968, FWACN 1981.	Senior Lecturer
5	Dr. B.O. OHEARI	PhD. 2011; M.Sc 1995; B.Sc. 1981, RN 1977, RM, 1979 RNT. 1981,	Senior Lecturer
6	Mrs. Roselynd. E. ESEWE	MSc Nursing 2014, MHPM, 2006, B.Sc Health Edu. DHAM, 1992, RN 1980, RM.1982.	Lecturer II
7	Mrs. Juliana. A. AFEMIKHE	M.Sc, health Planning & Mgt 2006, BNSc. 2006, RN 1982, RM1985	Lecturer II

		Health Mgt Staff Nurse/ Midwife 1979, UniBen Health Center, 1990 Balmalete SOM.Ramotswa. Botsuwana2002	
8	Mrs. Christie E OMOROGBE	M.phil, Masters Medical Soc, B.Sc Nursing Edu. , RM, RN. RNT.	Lecturer II
9	Mrs. Felicia E. AMIEGHEME	MPHIL Mental Health Masters in Public Health 2004, MHealth Planning &Mgt 1993, B.Sc Nursing Edu 1991, RM 1983, RN 1980 .RNT 1991.	Lecturer II
10	Mrs. Lucy O. CHUKWUKA	Med G& C, 1999, BSc 1989, RN,1977, RM 1980	Lecturer II
11	Mrs. Christie A. ENUKU	MSc Nursing 2012, MHPM2006, B.Sc (Health Edu) 2001 DHAM 1991, RN1986 /RM 1990,	Lecturer II
12	Rev. Sr. Joan N CHUKWURAH	Masters Nursing Education 2006 B.Sc Nursing, 2004, RN 1999, RM 2000, RNT,2010	Lecturer II
13	Miss Sarah O. OGBEBOR	BNSc, RN, RM, Dip Educ.	Graduate Assistant
14.	Mrs Chinyere EDO- OSAGIE	BNSc, RN,RM	Graduate Assistant
15.	Mr. T.A. EHWARIEME	BNSc 2008, RN 2009, RM 2010.	Graduate Assistant

**TECHNICAL STAFF**

1	Mrs.Mabel.E.L.OBANOR	M.Sc. Planning & Management, B. Sc. B.ED. RNT. RM, RN Family Planning	Chief Technologist
2	Mrs. Mary A. INIOMOR	B.Sc Social Work, BSc Nursing. Diploma in RMT Midwifery, (Edu) Diploma in Public Health, RN, RM.	Principal Lab. Technologist
3	MRS Mary. E. IDAHOSA	MPHE, BSc ED, RN, RM, RNT	Senior Lab. Technologist
4	MRS Mercy Oritsegbumi IMOUKHUEDE	M ED G & C, BSc. Bed Health education, RN, RM	Senior Lab. Technologist
5.	Mrs. Josephine OKO-OSE	M.Sc Physiology B.N.Sc Nursing B.Sc (ED) Health Education. RAEN.RM.RN	Clinical Instructor

**NON-ACADEMIC STAFF**

1	Mrs. C.S. OLUMESE	BA. International Studies & Diplomacy (2007)	Administrative Assistant
2	Mrs. B.B AKINBOYEWA	NCE, BA. International Studies & Diplomacy (2007)	Higher Executive Officer
3	Mr. M. AISIEN	CPA, GCE. O/L	Higher Executive Officer
4	Mrs. H.E. OISAMAYE	Conf. Secretaryship (CS IV) 2001, National Diploma Certificate (ND) 2003, Higher National Diploma	Confidential Secretary 1

		(HND) 2006. Computer Training Certificate 2010.	
5	Miss Victoria ADUBOR	Dip Computer Studies, 2004 NABTEB, WAEC, 50 W.P.M. Typing, Shorthand 100 & 120 W.P.M 2010, BSc. Social Work in view.	Chief Data Entry Personnel
6	Mr. J.O. OKOTIE	D.I.A Accounting,	Assistant Executive Officer
7	Mrs. T. NWANKWO	S 75 GCE 2 sitting	Assist Chief Clerical Officer
8	Miss B. Iyobosa OBASUYI	BSc. Microbiology 2007, Dip. Applied Microbiology 2003 WASC 2000.	Lab. Attendant
9.	Mr. Osaruonamen AGHO	WAEC, (International Studies & Diplomacy in view)	Clerical Officer
10.	Mr. M. O. IMAFIDON	WASC, BA. International Studies & Diplomacy (2011)	Hall Supervisor
11.	Mrs. OMOROGBE E.	WASC	Senior Porter
12.	Mr. IYAYI S.	WASC	Senior Porter
13.	Mrs. OSHODIN Mary	Primary 6	Ward Orderly

## PREAMBLE

The Bachelor of Nursing Science (BN.Sc) programme is a generic nursing programme developed in response to the societal needs and demand for polyvalent nurses who are educated in an institution of higher learning. The current trends in nursing also justify a higher academic level of scientific involvement in nursing practice that can cope with new innovations and advancement in technology. Since there is a yearning for a higher education in nursing, the University of Benin has decided to provide training in this area. In accordance to the National Universities Commission, candidates with relevant

qualifications should be admitted for the five year degree programme. The first set of students were admitted into the University of Benin in 2007/2008 session.

## HISTORICAL BACKGROUND OF THE INSTITUTION

The University of Benin Edict No. 3 of 1975 and the University of Transitional Provision Decree No 20 of 1975 under section 25-29 established the College of Medical Sciences. The enabling law provided inter-alia that the college shall constitute of:

- a) The School of Medicine
- b) The School of Dentistry and
- c) Any other School, Institute, Centers, Research and Teaching Units as may be from time to time prescribed or established as part thereof.

At the onset, the college had the following Schools and institute namely: School of Medicine, School of Dentistry, School of Pharmacy and Institute of Child Health.

In 1992, the collegiate System was introduced throughout the University. The College of Medical Sciences in the arrangement retained its original components. However, the collegiate system was abrogated in 1994. When the College of Medical Sciences was resuscitated in September 1999, it reverted to the original mandate under which it was originally established but without the school of Pharmacy.

At the 186<sup>th</sup> regular meeting of Senate held on Tuesday 23<sup>rd</sup> December 2003, Senate approved the proposal for the establishment of a School of Basic Medical Sciences to be based in the College of Medical Sciences.

The School of Basic Medical Sciences took off initially, in the 2003/2004 academic session with the departments of Anatomy, Physiology and Medical Biochemistry. This was accelerated by the facilities and staff on ground. Accordingly in 2007/2008, the department of Nursing Science took off with initial student enrolment of 20 through Joint Matriculation Examination and Post University Matriculation Examination.

However, the department of Nursing Science did not meet all the Requirements of the Resources Verification Exercise which was conducted in 2007 due to insufficient number of academic staff on ground. The department had re-applied for another verification exercise having met the requirement highlighted earlier by the Resource Verification exercise and the NUC came in 2011,. The latter exercise was successful.

## PHILOSOPHY OF THE PROGRAMME

The programme was established as a response to the national need of nursing manpower development. In the globalization of nursing, the trend is towards development of polyvalent graduates who will provide quality care in health care delivery. Health care delivery requires sound knowledge and professional effectiveness and efficiency, products of the programme will be nurse clinicians.

1. Man is a bio-psychosocial being with unique responsibility for health problems and his needs are the focus of all nursing activities.
2. Nursing is a professional relationship between the nurse and his/her client which is based on relevant concepts, principles and theories in the sciences, technology and the arts. It is client-centered; client-client-friendly and client-attested to ensure quality care.
3. Education is not only a life-long process; it is also an instrument of change. University education is the key to the growth of professionals, hence professional nursing education can be achieved in an institution of higher learning that provide a foundation for general education in the arts and sciences.
4. Nursing functions cut across the life span of individuals, families and communities within the health care delivery system. In order to provide quality care, Nursing education must meet globally accepted standard as available in the University.
5. The health care system exists to meet the needs of the clients, individuals, families, group or communities, by providing primary, secondary and tertiary health maintenance activities that ensure maintenance of high level of wellness.

Based on the afore-mentioned principles, this programme sets out to produce educationally and professionally sound Nurses whose assertion on nursing care will be unequivocal in every aspect of client care. The programme will also be responsive to the needs of the society.

#### **JUSTIFICATION**

The University of Benin being a First Generation University and a Federally funded university is well poised to meet the dire need of running a Department of Nursing for the following reasons:

- (1) The University is owned by the Federal Government and needs to produce graduates who are professionally equipped for future services in the Country and candidates are aware of the future fortunes in the Nursing profession and are much inclined to apply for the programme.
- (2) The nation has a fast developing health sector, and will continue to need more health professionals including highly skilled graduate nurses.
- (3) Graduate Nurses can create job for themselves and others and so contribute to the buoyant economy of the country in line with the vision of the founding fathers of University of Benin.

- (4) Nursing Council tends to abolish the Diploma programme, hence the need for a replacement with the degree programme.

#### **OBJECTIVES**

The objectives of the programme are to:

1. Prepare graduates of this programme as Nurse Clinicians, who through their practice will provide quality care to clients.
2. Educate nurses who will be able to carry out research aimed at improving the quality of nursing care.
3. Produce graduates with academic training that will enable them undertake postgraduate degree programme in Nursing and careers in Nursing education at the university level.
4. Educate nurses who can set up their own practice.
5. Educate nurses who can provide advancement in knowledge and generate ideas in the practice of Nursing.
6. Produce competent professionals that will be able to formulate and interpret policies relevant to Nursing.
7. Equip nurses with skill to be effective team players with other Health professionals.
8. To produce nurses with the ability to use critical thinking and decision making skills effectively.

#### **COMPETENCIES EXPECTED OF GRADUATES OF THE PROGRAMME**

The competencies of a nurse who is a graduate of this Degree programme in Nursing include the ability to:

1. Utilize Nursing process in the care of individual, family and community.
2. Adopt appropriate Nursing care delivery model in any setting.
3. Assess client/patient through history-taking, physical assessment, and review of relevant records and make appropriate nursing diagnosis.
4. Apply relevant concepts, principles and theories of administration and management in delivery of health care services at various levels.

5. Plan individual, family and community Nursing intervention.
6. Assume responsibility for delivery of dependent, independent and interdependent Nursing activities in any setting.
7. Evaluate Nursing care to ascertain effectiveness of nursing actions rendered to individual, family and community-based on objectives set.
8. Develop strategies for health promotion and maintenance in families and communities.
9. Develop proficiency in assessing, diagnosing, implementing and appropriate specialized Nursing care measure in any health problem situation.
10. Provide rehabilitative services to individuals, families and adapt to changing conditions.
11. Provide leadership in Nursing and health care delivery in their relevant specialties.
12. Understanding leadership roles in budgeting, managing and auditing human and material resources available for health care delivery.
13. Develop proficiency in interpreting special diagnostic reports to enhance management of client.
14. Function as a nurse in any area of clinical practice to establish and maintain a referral system.

### **Admission Requirements**

#### **Matriculation Requirements**

Candidates seeking admission into the B.N.Sc. programme of the Department of Nursing, College of Medical Sciences, University Of Benin, must satisfy the general entry requirements of the University as well as the minimum entry requirements for the B.N.Sc. programme as stipulated below:

1. Senior secondary school certificate or its approved equivalent with credit in English language, Mathematics, Physics, Chemistry and Biology at not more than two sittings with a relevant pass in the Unified Tertiary Matriculation Examination (UTME).
2. **DIRECT ENTRY**  
Candidates must satisfy the above minimum requirement for admission, except the UTME requirement.  
In addition, candidates must have any of the following:
  - a. Registered Nurse (RN) certificate registrable by Nursing and Midwifery Council of Nigeria.
  - b. General Certificate of Education at advanced level, or its approved equivalent, with passes in Physics, Chemistry and Biology.
  - c. First degree of University of Benin and any other recognized University approved by Senate in Life Sciences.
  - d. A relevant pass in the Post Direct Entry Examination.(PUDE)
3. **INTER AND INTRA UNIVERSITY TRANSFER**  
Transferring students from other science departments in University of Benin at 200 levels must attain a minimum CGPA of 4.00 points

#### **TRAINING FORMAT**

The training format for B.N.Sc shall be based on the following:

- \* Mode of study; candidates are required to register fulltime.
- \* Type of course system: A modified course credit system will be adopted,
- \* Course coding system: A system of identifying a course using the combination of 3 letters and 3 digits according to UNIBEN standard would be used.

The 3 letters for Nursing Science are NSC; while the first of the three number digits denotes the level, the second denotes semester and the third denotes course number.

## TEACHING METHODS

Teaching methods will integrate theory, demonstration and clinical practice experience. It is expected that all lecturers will work with the students in the classrooms as well as clinical areas.

Teaching methods to be used include:

Lecture/Discussion  
Lecture/Demonstration  
Didactic lecture  
Clinical practice  
Seminar/workshop  
Group/Individual presentations  
Field trip  
Client care study  
Role modeling  
Project

## Departmental Academic Standard

The department operates a modified course system.

At the 100 level any student who fails any course shall repeat the class.

Failure at repeat year will mean withdrawal from the programme.

Candidate must pass all courses before proceeding to the next level.

At the 200 - 500 levels any student who fails not more than two courses for the first time shall be allowed a resit examination, if he or she fails again the student shall repeat the year and retake all the courses failed. Failure at repeat year will mean withdrawal from the programme. No carryover of courses shall be allowed.

## COURSE ASSESSMENT

- a. Continuous Assessment is compulsory in all subjects taught
- b. Promotion to upper level shall be based on the following performance
  - i. Continuous assessment (C.A.)
  - ii. The specified papers, practical and oral examination
  - iii. Obtaining a minimum of 70% attendance in class and clinical placements will qualify student to sit for examination.
- c. Continuous Assessment and the semester examination will attract 25% and 75% of the total marks respectively.
- d. The pass mark for each subject of examination at the 100 level shall be 40% and all courses at 200 to 500 levels shall attract 50%.

## (i) TEST DEVELOPMENT

The setting of examination question is based on team teaching approach. The setting of question entails 60% theory and 40% multiple choice answers in written papers. The practical examination shall attract 90% and viva 10%.

## (ii) CONDUCT OF EXAMINATION

Examinations are conducted in lecture theatres and lecture rooms with strict supervision of lecturers, examination assistants and security officers in accordance with University of Benin Academic regulations and Teacher's code.

## (iii) EVALUATION SCHEMES

Questions and Marking schemes are set at all levels. At final year, these are moderated by external assessors. Any course failed shall disqualify the student from graduating until when passed in subsequent years and under conditions that may be prescribed by the University from time to time.

The professional examinations of the Nursing and Midwifery Council of Nigeria and West Africa Health Examination Board shall be conducted, passed, retaken or no longer allowed in accordance with the condition set by the relevant examination bodies.

## DURATION OF THE PROGRAMME

The BNSc. programme shall run for five academic years for UTME entry candidates and four years for direct entry candidates.

## EXAMINATION REGULATIONS

1. Candidates will be required to register for courses within and outside the department as recommended by the College and approved by the senate.
2. Continuous assessment shall be made on all subjects taught.
3. Promotion to the next level shall be based on:
  - Obtaining a minimum of 75% attendance in class.

- Continuous Assessment and the semester examination will attract 25% and 75% of the total marks respectively.
  - Examination in each specified course shall be in the form of written, practical examination and viva.
  - The pass mark for each course of examination at the 100 level and other non- (iii) college courses shall be 40%, while all other college courses at 200 to 500 levels shall be 50%.
4. Courses shall be prefixed as specified by the respective departments.
  5. A student at 200 to 500 levels who fails not more than two courses shall resit the examination. If he or she fails again the student shall repeat the year and retake all the courses failed. Failure at repeat year will mean withdrawal from the programme.
  7. In any Nursing course a candidate who fails the practical/clinical examination shall be required to repeat the clinical placements for a period of two weeks before resitting the examination.
  8. The total number of units taken along with grades obtained in each course shall be recorded for the purpose of calculating the cumulative grade point average (CGPA).
  9. The CGPA shall be used for the determination of the class of the degree.
  10. A candidate who fails more than two courses in the final examination of the repeat year and must have exhausted the University required years of study may be required to withdraw from the programme.
  11. It is mandatory that students should pass at least one professional examination of the Nursing and Midwifery Council of Nigeria before the completion of the degree programme, failure of which, the candidates may not be licensed by the professional bodies. The professional examinations are General Nursing, Midwifery, and Public Health Nursing.

#### **CLASSIFICATION OF DEGREE**

The degree of BNSc shall be classified into:

- (i) Pass (with distinction)
- (ii) Pass (with credit)
- Pass

#### **REGULATIONS GUIDING PROFESSIONAL EXAMINATIONS**

1. Indexing: Undergraduate students of the B.N.Sc. programme shall be presented to the Nursing and Midwifery Council of Nigeria (N&MCN) for indexing, at the beginning of 300 Level, having passed all 100 and 200 Level courses.
2. Having passed all 400 Level courses, a pre-qualifying/screening examination, using the N&MCN format and procedures shall be conducted by the department. One of such procedures is ensuring that the examination is conducted by internal and external N&MCN examiners. Only students who pass such examination shall be presented for the N&MCN final qualifying examination for General Nurses.
3. During 400 Level (May or November), indexed students shall be registered for the N&MCN final qualifying examination for General Nurses, having passed the pre-qualifying/screening examination in “2” above.
4. Presentation of students for the N&MCN final qualifying examination for Midwives, shall be at 500 Level (March or September), provided that the result of the N&MCN final qualifying examination for General Nurses earlier sat for in “3” above, had been passed.
5. Students who have passed N&MCN final qualifying examination for General Nurses and have graduated can however register through the department for any of the 2 other professional examinations.
6. Presentation of students for the WAHEB examination for Public Health Nurses will come up after the final degree examinations on completion of the 2<sup>nd</sup> Semester of 500 Level (June). Passing the N&MCN final qualifying examination for General Nurses, is a pre-requisite for the WAHEB examination for Public Health Nurses.
7. It is MANDATORY that students pass at least the professional examination of N&MCN final qualifying examination for General Nurses before completion of the degree programme.
8. The above notwithstanding, all other rules and regulations guiding the professional examinations (N&MCN and WAHEB) are applicable

The students are eligible to sit for

1. General Nursing at the end of 400level
2. Midwifery at 500level
3. Public Health Nursing at 500level

Indexing with the N&MCN for RN examination is in 300 Level.

Indexing with the N&MCN for RM examination is in 400 Level.

Indexing with WAHEB for Public Health Nursing examination is at the beginning of 500 Level.

External Examiner must be a minimum of Senior Lecturer and shall moderate the pre-professional examinations (mock). Also must moderate the final (5<sup>th</sup> year) examination in accordance with existing examination regulations of UNIBEN, Benin City

### COURSE CONTENT

#### 100 LEVELS

##### FIRST SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture	Tutorial	Practical	Units
CHM111	General Chemistry I		2	0	3	3
CHM113	Organic Chemistry I	2	2	0	3	3
PHY111	Mechanics, Thermal Physics and Properties of Matter			0	3	3
PHY113	Vibrations, Waves and Optics		2	0	3	3
BOT111	Diversity of Plants		2	0	3	3
AEB11	Introductory Zoology		3	0	3	4
GST 111	Use of English I		2	0	0	2
GST112	Philosophy and Logic		2	0	0	2
MTH111	Elementary Mathematics		3	0	0	3
						26 units

#### SECOND SEMESTER.

Course Code	Course Title	Pre-Requisite	Lecture	Tutorial	Practical	Units
CHM 122	General Chemistry II		2	0	3	3
CHM124	Organic Chemistry		2	0	3	3
PHY109	Practical Physics		0	0	6	2
PHY124	Electromagnetic & Modern Physics		2	0	0	2
BOT122	Plant form and Functions		3	0	0	3
AEB 122	Functional Zoology		3	0	3	4
GST121	Use of English II		2	0	0	2
GST122	Nigerian Peoples and Culture		2	0	0	2
GST123	History & Philosophy of Science		2	0	3	3
						23units

#### FIRST SEMESTER

#### 200 LEVEL

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 211	Foundation of Professional Nursing		2	0	0	2
SAA 111	Introduction to Sociology		3	0	0	3
NSC 212	Clinical Nursing Practice		0	0	6	2
ANT 218	Human Anatomy I		1		3	2
ANT 217	General Gross Anatomy 1		1		3	2
PHS 212	Physiology 1		1	0	3	2
CSC110	Introduction to Computer		2	-	-	2
NSC 214	Nutrition and Dietetics		2	0	0	2
PSY 211	Developmental Psychology		2	0	2	2
PHS 213	Physiology 11		1	0	3	2
MBC 213	Introductory Biochemistry		2	0	3	3
POL 111	Introduction to Political Science		3	0	0	3
	<b>Total</b>					<b>27</b>

### SECOND SEMESTER

(Long Break): Concentrated Clinical – 5 weeks

Course Code	Course Title	Pre-Requisite	Lecture	Tutorial	Practical Hours	Remark
NSC 221	Foundation of Professional	NSC 211	2	0		2
NSC 222	Clinical Nursing Practicum		0	-	6	2
ANT 227	Basic Histology and Embryology		1		3	2
ANT 228	Gross Anatomy		1		3	2
PHS 224	Physiology 111		2	-		2
PHS 225	Physiology 1V		2	0		2
MBC 221	Metabolism of Carbohydrates, Proteins and lipids		3	0	0	3
NSC 223	Perspectives in Nursing		2	0	0	2
MMB 212	Medical Microbiology and Parasitology		1	0	3	2
	<b>Total</b>					<b>19</b>

### 300 LEVEL

#### FIRST SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 311	Community Health Nursing 1		2	0	0	2
NSC 315	Medical Surgical Nursing 1	ANT227/2	3	1	0	4
NSC 316	Medical Surgical Nursing Practicum	NSC 221	0	0	6	2
NSC 314	Human Behaviour In Health and Disease in the community		3	0	0	3
NSC 313	Epidemiology		3	0	0	3
NSC312	Nutrition in Health and Diseases		2	0	0	2
CED 300	Introduction to theory and practice of entrepreneurship		2	0	0	2
NSC 317	Environmental Health		2	0	0	2
NSC 318	Community Health Nursing Practicum		0	0	6	2
	<b>TOTAL</b>					<b>24</b>

#### SECOND SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 325	Medical Surgical Nursing 11		3	1	0	4
NSC 326	Medical Surgical Nursing Practicum		0	0	6	2
MMB 321	General and Cellular Pathology		3	0	0	3
NSC 328	Introduction to Research Methodology		2	0	0	2
PCO 320	Clinical Pharmacology and Chemotherapy		3	0	0	3
NSC 324	Maternal & Child Health Nursing 1		2	0	0	2
BOT 315	Biostatistics		2	0	0	2
NSC 321	Community Health Nursing 11		2	0	0	2
NSC 322	Community Health Nursing Practicum	0	0	0	6	2
NSC 327	Mental Health and Psychiatry Nursing 1		2	0	0	2
	<b>TOTAL</b>					<b>24</b>

(Long Break): Concentrated Clinical – 5 weeks

400 LEVEL

FIRST SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 415	Medical Surgical Nursing I11		3	1	0	4
NSC 416	Medical Surgical Nursing Practicum		0	0	6	2
NSC 414	Maternal and Child Health & Family Planning 11		2	1	3	4
NSC 418	Maternal & Child Health Practicum		0	0	6	2
NSC 417	Mental Health & Psychiatric Nursing 11		2	0	3	3
PCO 410	Clinical Pharmacology and Chemotherapy		3	0	0	3
NSC 411	Research Methodology		2	1	-	3
NSC 413	Management of Nursing Care Services		2	0	0	2
NSC 412	Principles of Education & Teaching Methodology		2	0	0	2
	<b>Total</b>					<b>25</b>

SECOND SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 425	Medical Surgical Nursing IV		3	1	-	4
NSC 426	Medical Surgical Nursing Practicum		0	0	6	2
NSC 424	Maternal & Child Health Nursing & Family Planning III		3	0	3	4
NSC. 428	Maternal & Child Health Practicum		0	0	6	2
NSC 423	Management of Nursing Care services Practicum		1	0	3	2
NSC 427	Health Economics		2	0	0	2
NSC 422	Teaching Practice		0	0	6	2
NSC 421	Nursing Ethics & Jurisprudence		2	0	0	2
	<b>Total</b>					<b>20</b>

(Long Break): Concentrated Clinical – 16 weeks (SIWES)

500 LEVEL

FIRST SEMESTER

Course Code	Course Title	Pre-Requisite	Lecture Hour	Tutorial	Practical Hours	Units
NSC 511	Community Health Nursing I11		2	1	0	3
NSC 514	Maternal and Child Health Nursing1V		2	1	0	3
NSC 519	Seminar in Nursing		3	0	0	3
NSC 517	Research Project I		3	0	0	3
NSC 518	Maternal & Child Health Practicum		0	0	6	2
NSC 513	Health Education		2	0	0	2
NSC 512	Community Health Nursing Practicum		0	0	6	2
NSC 515	Medical Surgical Nursing V		0	0	0	2
	TOTAL					20
	<b>One Elective from</b>					
NSC. 500	Geriatric Nursing		2	0	3	3
NSC. 501	Radiology/Radiotherapy Nursing		2	0	3	3
NSC. 502	Ophthalmic Nursing		2	0	3	3
NSC. 503	Orthopedic Nursing		2	0	3	3
NSC. 504	Dermatology Nursing		2	0	3	3
NSC. 505	Genetic Nursing		2	0	3	3

SECOND SEMESTER

Course Code	Course Title	Pre-Requisi	Lecture Hour	Tutoria	Practical Hours	Units
NSC 521	Community Health Nursing 1V		2	1	0	3
NSC 522	Community Health Nursing Practicum		0	0	6	2
NSC 524	Maternal and Child Nursing		3	1	0	3
NSC 523	Counseling Skills in Nursing		2	0	0	2
NSC 525	Maternal and Child Nursing Practicum		4	0	0	2
NSC 528	Seminar in Nursing		2	0	0	2
NSC 527	Research Project II		0	0	0	6
	TOTAL					20
	<b>One Elective from</b>					
NSC 506	Orthorhinolaryngology Nursing		2	0	3	3
NSC 507	Anaesthetic Nursing		2	0	3	3
NSC 508	Peri Operative Nursing		2	0	3	3
NSC 509	Peadiatrics Nursing		2	0	3	3
NSC 510	Intensive Care Nursing		2	0	3	3

Cumulative Credit Load For UTME and Direct entry

5Year Programming

100	200	300	400	500	
50	44	48	45	45	201

Direct

200	300	400	500	
44	48	45	45	151

## COURSE DESCRIPTION

### 200 LEVEL

#### FIRST SEMESTER

##### **NSC 211: FOUNDATIONS OF PROFESSIONAL NURSING (2 Credits)**

The course provides a foundation of concepts, theories and principles which will enable the students understand and integrate the content that is the composite of Nursing as a science and an art. It entails the nature of Health and Illness, Organization of National health care system, Historical Development of Nursing, Contribution of the individual nurse, organized nursing services/agencies to the Nursing Profession at the local and world community. Introduction to ethical consideration in nursing practice: Introduction to major concepts, assumption and basic skills underlying professional nursing practice: functions of the professional nurse including the nurse-patient interaction, Discussion on scientific principles and the nursing process in the practice of nursing, Nursing as it relates to health care, social and culture set up. Concepts and trends and history of nursing, interpersonal relationships in Nursing, ethics and philosophy of nursing; comfort and safety measures. Diagnostic measures, understanding the various categories of health institutions and their relevance in the health field; physical assessment, theoretical basis for nursing practice.

##### **SAA 111: INTRODUCTION TO SOCIOLOGY (3 Credits)**

The course explains the nature, definition, history, perspectives, application of sociology, other social sciences, discipline and scientific method will be examined. Sociological concepts such as society, culture, and social structure, Social roles and status, socialization, social institution, social sanctions: social groups and community.

##### **NSC 212: CLINICAL NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice which is designed, to meet the comfort, safety measures, basic needs and the hygienic needs of the patients. the practicum include admission, transfer and discharge of patients, the patient with nutritional needs, administration of medications, basic nursing interventions, wound care and bandaging

##### **ANT 207: GENERAL HUMAN ANATOMY & ANATOMY OF THE LIMBS & THORAX (2 Credits)**

This course examines the basic Anatomy terminologies used in the study of anatomy. It also describes the anatomy of the upper limb, lower limb and thorax.( including the cardiovascular system to respiratory system).

##### **ANT 217: GENERAL GROSS ANATOMY 11 (2 Credits)**

The course describes the gross anatomy of the abdomen, pelvis and perineum (including the urogenital system, gastrointestinal tract).

##### **PHS 212: PHYSIOLOGY 1 (2 Credits)**

This course explains the General physiology, excitable tissues, blood and body fluids and renal physiology.

##### **CSC 110: INTRODUCTION TO COMPUTER (2 Credits)**

The course introduces the history of Computers, functional components of a computer, characteristics of a computer, problem solving flowcharts and algorithm. It also includes basic computer programming statement, Symbolic names: arrays subscripts expression and control statements and introduction to visual basic programming computer applications.

##### **PHS 213: PHYSIOLOGY 11 (2 Credits)**

This course is a continuation of PHS 212. It entails cardiovascular and respiratory physiology.

##### **NSC 214: INTRODUCTION TO NUTRITION AND DIETETICS: (2 Credits)**

This course describes the Historical perspective, Nutrition as a Science, Classification of food and their nutrients, Relationship of digestion and absorption of food Nutrient, quality of local foods and diets. Selection and formulation of balanced and weaning diets, Use of food composition tables, Nutrient requirements and recommended daily caloric requirements, Food in relation to the life cycle, Dietetics and diet in illness.

##### **PSY 211: DEVELOPMENTAL PSYCHOLOGY: (2 Credits)**

The course describes the introduction to the relationship between the functioning of social systems and behaviour and attitude of individual. It provides an overview of the principles of psychology. The students are taught the principles of growth and development, personality and theories of personal development. They are also exposed to the techniques of counseling, group structure as well as attitudes formation and attitudinal change.

##### **MBC 213: INTRODUCTORY BIOCHEMISTRY: (2 Credits)**

This course covers the Short history and Definition of Biochemistry, Importance of Biochemistry to medicine and other scientific disciplines. Classification: Chemistry and Structure of Carbohydrates, Proteins and Lipids and Functional role of Biomolecules. Enzymes: Classification, structure and functions, Coenzymes and cofactors, Nucleic acids. DNA, RNA, Gene and Genome organization, Protein synthesis, Diet and Food value, Biochemistry of vitamins and minerals, Vitamin deficiency.

**POL III: INTRODUCTION TO POLITICAL SCIENCE (3 Credits)**

The course introduces students to the nature of politics, its organization and its study. Emphasis is placed on the foundation of politics as a system of political life. The course also acquaints students with the problem of application of scientific methods to the study of politics, to history and various approaches of the subject matter and to a number of basic concepts in political science.

**Total 25 units**

**SECOND SEMESTER****NSC 221: FOUNDATIONS OF PROFESSIONAL NURSING (2 Credits)**

The course describes the definition of first aid, action in an emergency, life -saving priorities, e.g. resuscitation, coping with choking, shock & unconsciousness. Medical emergencies, childhood problems, wound & bleeding, bone and muscle injuries, burns and scalds, poisoning & actions to be taking, first aid kit safety and their management. Immunity e.g. definition, types etc, Asepsis, the type of patients nurses cared for. It also explained what illness, diseases & wellness including related theories.

**NSC 222: Clinical Nursing Practicum (2 Credits)**

This course entails both the laboratory and clinical practice designed to manage patient with urinary system disorder, body fluid and blood disorders, disorder of eyes, ears, nose and throat, gastrointestinal disorder including diagnostic procedure for gastro – intestinal system. It also entails the care of patient with nervous system disorder including lumbar puncture as well as providing sterile environment.

**ANT 213: GENERAL GROSS ANATOMY II: (2 Credits)**

The course describes the anatomy of the head and neck (including the endocrine system, central nervous system) Prospected specimens will be demonstrated to the students.

**ANT 2278 GENERAL BASIC EMBRYOLOGY AND HISTOLOGY (2 Credits)**

The course explains the description of the formation, development of the embryo and the organ systems, structure and the function of the cell; Epithelia and general microanatomy and basic tissues of the body. It also discusses the Cell structure and function Meiosis (Cell division), Tissues of the body and organs (Tissues of the body such as epithelial tissue, connective tissue, muscular tissue and nervous tissue).

**PHS 224: PHYSIOLOGY 111 (2 Credits)**

This course describes the renal physiology, reproduction, endocrinology and gastrointestinal Tract physiology

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**PHS 225: PHYSIOLOGY 1V (2 Credits)**

This course describes the autonomic nervous system (ANS), Central nervous system (CNS) and special senses

**MBC 221: METABOLISM OF CARBOHYDRATE, PROTEINS AND LIPIDS (3Credits)**

This course explains Carbohydrate metabolism: Digestion, Absorption, Glycolysis, TCA Cycle, Oxidative phosphorylation, Glycogen metabolism, Pentose Phosphate Pathway, Gluconeogenesis, and Glyoxylate Cycle.

Metabolism of Proteins and Amino acids: Digestion, Deamination, Transamination, Urea Cyle, Glucogenic and Ketogenic Amino acids.

Metabolism of Lipids: Digestion, Absorption, Transportation of Lipids.β- oxidation, Ketone bodies and Ketosis.Integration of Metabolism.

Introductory Kinetics and Energetic

**NSC 223: PERSPECTIVES IN NURSING (2 Credits)**

This Course discusses the sociological, philosophical and historical perspectives of nursing. Definitions of Sociological concepts and the relationship of culture to nursing practice are discussed. Definition, types of philosophy and relevance to nursing are explored. History of nursing internationally and nationally and the roles of Nursing and Midwifery council of Nigeria (N & MCN) and National Association of Nigerian Nurses and Midwives (NANNM) in nursing education, practice and research are discussed.

**MMB 212: MEDICAL MICROBIOLOGY AND PARASITOLOGY: (2 Credits):**

The course covers the study of characterization and classification of micro-organisms, characteristics of bacteria, micro-organisms other than bacteria, Medical helminthology: control of microorganism and parasites, relationships of microorganisms and parasites to disease.

**Total 19 units**

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### 300 LEVEL

#### FIRST SEMESTER

##### **NSC 311: COMMUNITY HEALTH NURSING I (2 Credits)**

The course introduces students to basic scientific principle and practice of community health and primary health care programs, Family and community health nursing diagnosis, through organized exposure to community health/primary health care programmes. Others include Public Health, primary health care nursing and school health programme.

##### **NSC 315: MEDICAL SURGICAL NURSING I (4 Credits)**

This course builds on foundation of professional nursing by in-depth study of steps in nursing process and health assessment; holistic approach to nursing care; homeostasis, immunology and psycho physiologic response to illnesses and nursing interventions. Experiences are further provided in the nursing of selected individuals and families to facilitate the theoretical learning and to further develop skills in nursing practice.

Students are introduced to the basic concepts of medical and surgical nursing. The course is taught using the system approach with review of the anatomy and physiology of the relevant systems and drugs used in the management of such conditions.

##### **NSC 316: MEDICAL SURGICAL NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice in Medical – Surgical Nursing the practicum include care of patient with respiratory system disorder, reproductive system disorder, surgical patients as well as care of patient with emergencies, before and after operation, also caring for patients with disorders of the cardiovascular system.

##### **NSC 314: HUMAN BEHAVIOR IN HEALTH AND DISEASE IN THE COMMUNITY: (3Credits)**

This course explains the characters of the family in health and disease, the Germ Theory as a way of explaining the concept of disease, demography and population dynamics, patterns of life in the community and how these are affected by disease. How patterns of the life and community organization affect care delivery. This course is also designed to enable the student acquire the knowledge of social-Psychological determinants of health behaviors. It enables her to initiate compliance behaviors by utilizing the principles of guidance and counseling. It also explains human development, cultural factors and behavior, beliefs, taboos and behaviors in health and illness. The health-illness continuum, the socialization process, development of personality and character formation, role identity and role function, Patterns of marriage and childbearing practices, group dynamics, leadership, group norms, interpersonal relations, communications, Principles and techniques of guidance and counseling.

##### **NSC 313: EPIDEMIOLOGY: (3 Credits)**

The course introduces students to the principles and methods of epidemiology as they are applied in study of both acute chronic diseases. The common indices of community health, the analytic methods of demography, the theory behind screening programmes, and measures are examined, Critical appraisal of nursing and medical literature are discussed.

##### **NSC 312: NUTRITION IN HEALTH AND DISEASES (2 Credits)**

The course discusses the historical perspective of nutrition as a science. The nutritional values of food and the effect on health are emphasized. Food purchasing, preparation presentation and diet therapy are studied to enable the student provide well-balanced diet to clients and patients. Historical perspective; Nutrition as a science; classification of food and their nutrition: quality of local foods and diets: Selection and formulation of balanced and weaning diet; Use of food composition tables: Nutrition: requirements and recommended daily calorie requirements. It also entails diabetics and diet in illness.

##### **CED 300: INTRODUCTION TO THEORY AND PRACTICE OF ENTREPRENEURSHIP (2 Credits)**

This course introduces Entrepreneur, Getting started, Selecting the legal forms of business, discovering Business Opportunities. It also discuss the legal framework for the Entrepreneurship, Government policies and Entrepreneurial activities, Ethical Issues in business, financing a new venture, Sources of marketing products and services, employing people, establishing and maintaining Accounting Records. Budgeting for planning and Control.

##### **NSC 317: ENVIRONMENTAL HEALTH. (2 Credits)**

The course is designed to examine the effects of environmental factors such as water, air, noise, biological, socio-cultural and socio economic on the health of the community, methods of assessing these factors and steps taken to improve on the quality of the environment will be discussed.

##### **NSC 318: COMMUNITY HEALTH NURSING PRACTICUM (2 Credits):**

This course entails both the laboratory and clinical practice community health nursing.. Organized exposure should take the following format:

- I. A period of posting to a defined rural and urban geographical-political community.
- II. Analysis and presentation of the data to describe community health problems, Social and health needs and Draw inferences for service objectives related to specific preventive, promotive and health maintenance strategies

**Total 24 unit**

## SECOND SEMESTER

### **NSC 325: MEDICAL-SURGICAL NURSING II (4 Credits)**

This course is designed to acquaint the students with diseases of the cardiovascular, pulmonary and gastro intestinal system. There is a review of appropriate anatomy and physiology, common diagnostic tests and other therapeutic interventions. The nursing process and nursing care plan approach will be utilized in the nursing management of patients with diseases in these systems.

### **NSC 326: MEDICAL SURGICAL NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice in medical – surgical nursing. The practicum experience entails caring for patient with homeostasis disorders, patients with integumentary disorders, disorders of the musculoskeletal system and dying patients, .

### **MMB 321: GENERAL AND CELLULAR PATHOLOGY (3 Credits)**

The course covers general mechanisms and causation of disease, pathogenesis of disease and the dynamic nature of disease as it evolves from its incipient stage to its full expression; an appreciation of the disease process as it affects other organs and distant parts of the body and most importantly the patient as a whole. The pathology of selected common diseases will be discussed.

### **NSC 328: INTRODUCTION TO RESEARCH METHODOLOGY (2 Credits)**

The course examines the definition and types of research. It discusses the research process (from the stage of problem identification, through review of literature, methodology, designs, data collection, ethical considerations, analysis and interpretations, discussion of findings and referencing).

### **PCO 320: CLINICAL PHARMACOLOGY AND CHEMOTHERAPY (2 Credits)**

The course is designed to enable the student acquire the knowledge of the derivation, actions and functions of drugs in the system of the body. It considers problems of drugs therapy and the contribution of traditional chemotherapeutic measure to health maintenance.

### **NSC 324: MATERNAL AND CHILD HEALTH NURSING I (3 Credits)**

The course introduces students to the basic concepts and principles off maternal and newborn care. It recognizes the concepts of team approach to maternal and child health practice. It also introduces students to the basic understanding of normal anatomy and physiology of the male and female reproductive

system and the newborn. It further introduces student to the components of reproductive health laying emphasis to strategies that will improve the quality of maternal health services and to increase awareness of maternal issues in the community.

### **BOT 315: BIOSTATISTICS (2 Credits)**

This course explains the population and samples, Probability distribution, normal Poison and Binomial distribution, Mean, Standard error, standard deviation, skewness Chi test, Student tests, F-distribution, Regression, Correlation coefficient and Analysis of variance (one way and two ways).

### **NSC 321: COMMUNITY HEALTH NURSING 11 (3 Credits)**

Introduction to basic concepts, historical development and scientific principles and practice of community health nursing and primary health care; the development community nursing and primary health care, conceptual foundation of community health practice, elements of community health nurse, community health care, role and responsibility of a community nurse, community health as a PHC practitioner, introduction to planning, programming and evaluation methods in community health, nursing and primary health care, community health nursing diagnosis, through organized exposure to community health/primary health care programmes, Care of Adolescent, Adult and Handicap, Health Education.

### **NSC 322: COMMUNITY HEALTH NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice community health nursing.. The organized exposure of students, using problem-based approach to community is as Follows: -

- i A Period of experience in a defined rural/urban geographical-political community.
- ii Collection of data for the assessment of health status of the community.
- iii Analysis and presentation of the data to describe community health problems, social and health needs, and draw inferences for service objectives related to specific preventive, promotive and health maintenance strategies.

### **NSC 327: MENTAL HEALTH AND PSYCHIATRIC NURSING (3 Credits)**

This course enables the student relate the knowledge of growth and development to mental health disorders and behavioral problems. It encourages her to develop an awareness of acceptance of behavioral changes of the mentally sick. The legal aspects of psychiatric nursing and the nurses role are stressed, history of mental health movement, national and international, growth and development theories, relationship of growth and development of behaviour, classification of mental health disorders, discussion of specific behaviours intervention by health care providers: individual and group approach, therapeutic care, behaviour management, nurses role: legal coverage. This

course deals with preventive mental health (primary, secondary and tertiary). It involves the knowledge of the roles of the traditional healers in the society and the effects of urban-rural migration on mental health. The course also deals with the typology of crisis, crisis intervention and planning of community mental health program.

#### **Concentrated Clinical for eight weeks**

- Medical/Surgical wards, three weeks
- Community Health Nursing outfit three weeks
- Special clinical posting, two weeks.

#### **400L FIRST SEMESTER**

##### **NSC415: MEDICAL-SURGICAL NURSING III: (4 Credits):**

The course builds on the students' prior knowledge thus enabling them to relate the knowledge to the reproductive, urinary, musculoskeletal and Intergumetary systems. Overview of Anatomy and physiology will be discussed. Nursing process will be utilized in nursing care management.

##### **NSC 416: MEDICAL SURGICAL NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice in Medical – Surgical Nursing.

It is the continuation of NSC 326 and special procedures

##### **NSC 414: MATERNAL AND CHILD HEALTH NURSING AND FAMILY PLANNING II (4 Credits):**

The course enables students apply in-depth knowledge of the anatomy and physiology of the

Reproductive system to the practice of normal midwifery. It also enables students to develop specialized knowledge and skills that will enable them manage the expectant mother during pregnancy, labour Puerperum and care of the newborn. It further introduces students to the application of nursing process in patient management.it emphasizes the health of the family during childbearing period with particular attention to the needs of the child.

##### **NSC 418: MATERNAL AND CHILD HEALTH NURSING PRACTICUM (2 Credits)**

This course entails both the laboratory and clinical practice in Maternal and Child Health Care Nursing which is designed to care for antenatal patients the experience include, history taking, physical examination, abdominal inspection, palpation, auscultation, laboratory investigations and health education.

##### **NSC 417: MENTAL HEALTH AND PSYCHIATRIC NURSING II (3 Credits)**

This course discusses the professional Nurses' role in the promotion of mental health, the classification of mental disorders and the nurse's roles. It also explains the introduction to theories of personality and the personality disorders, various therapeutic media of the psychiatric patient and Legal aspects of psychiatric nursing.

##### **PCO 410: CLINICAL PHARMACOLOGY AND CHEMOTHERAPY (3 CREDITS)**

The course examines the General principles of chemotherapy, Pharmacology of (1) Antibacterial drugs (2) Antifungal drugs (3) Antiviral Drugs (4) Antiviral Agents (5) Antimalaria and current drug treatment policy (6) Antiparasitic agents.

Special considerations for (a) Antileptrotic agents ant treatment policy (b) Antituberculous therapy and policy (c) antiretroviral agents and Acquired Immunodeficiency syndrome(AIDS)treatment policy, Antineoplastic agents.

#### **SYSTEMIC PHARMACOLOGY**

##### **COURSE OUTLINE**

Cardiovaslar system; Antihypertensive drugs, Antiarrhythmic agents, vasodilators and Vasoconstrictors, drugs in treatment of cardiac failure, antithrombotic agents

**Respiratory System;** anti tussive agents, bronchodilators and anti-asthmatic agents

**Renal system;** Diuretics, Urinary antiseptics

**Gastrointestinal system:** Antacids and andante-peptic ulcer diseases agents, antiemetics, anti-motility agents, cathartics,

**Endocrine System;** Anti diabetic agents, drugs in management of hyperthyroidism and myxoedema, steroidal anti-inflammatory drugs and their uses, drugs in management of Infertility and Erectile dysfunction

**Nervous system:** Analgesic, analgesic and anti-Anticonvulsants, Convulsant agents. Antidepressant/Anxiolytic agents,

Commonly abused drugs.

Miscellaneous; Vitamins A, B1, B2, B6, B12, C, D, E, Folic acid, Iron, Erythropoietin etc

##### **NSC 411: RESEARCH METHODS IN NURSING (3 Credits)**

The course explain the application and use of the research process in identifying and solving nursing problems and other related areas are also discussed. It also discusses the awareness, needs, types of research and the application of research process in identifying and solving nursing problems .

##### **NSC 413: MANAGEMENT OF NURSING CARE SERVICES: (2 Credits)**

The aim of the course is to introduce the students to the philosophy, theory, principles and techniques of management in relation to nursing care services. Essential tools to

effective management will be discussed; and management techniques will be analyzed in relation to nursing care situations at various care settings. The nursing process as a tool for scientific approach to solving problems will be examined. The health care delivery system (national and international), tools of management, communication and interpersonal relationship, interviewing skill, concept of guidance and counseling, elements of nursing management, standard of nursing practice, management, standards of nursing practice, management human and materials of services, budgeting and staffing, supervisory process, concepts of evaluation of clinical settings, accountability and the role research in practice.

**NSC 412: PRINCIPLES OF EDUCATION AND TEACHING METHODOLOGY (2 Credits):**

This course is designed to introduce the student to the principles of education methodology. It stresses the role of the student as a teacher and health education; principle of education, principles of teaching/learning philosophy and objective of education in Nigeria; relationship of the national policy and philosophy on education to the education of nurses; qualities of a teacher, teacher/learner interaction; the learning environment, the learner, deductive and inductive reasoning, concepts of motivation development of instructional objectives; development of course content, method of evaluation; Traditional and modern/innovative teaching method as they apply to health professional education; and educational communication media, development and implementation of teaching plans in clinical setting. Curriculum development involves an over view of course, whereby the student looks at the course critically and objectively as a functional instrument. It involves the development of institutional philosophy, theory, principles and techniques of management in relation to nursing care services.

**Total Units: 25 Units**

**SECOND SEMESTER**

**NSC425: MEDICAL-SURGICAL NURSING IV (4 Credits)**

This is a continuation of NSC 415 and describes conditions affecting the Nervous and Endocrine System, growth and cellular proliferation and sensorineural conditions. Review of the relevant anatomy and physiology of the system is carried out. The nursing process is used as a framework for delivery of nursing care to these groups of patients.

**NOTE: Gerontologic and genetic implications are considered in all the systems.**

**NSC 426: MEDICAL – SURGICAL NURSING PRACTICUM (2 Credits)** This course entails both the laboratory and clinical practice in Medical – Surgical Nursing in special clinics such as theatre, outpatient, surgical clinic, renal clinic, ENT unit, burns unit, cardio-pulmonary unit etc.

**NSC 424: MATERNAL AND CHILD HEALTH NURSING III (4 Credits)**

The course is a continuation NSC 414 which further lays emphasis on the health of the family during childbearing period with particular attention to the needs of the child. The role of the nurse in family planning and genetic counseling is emphasized. The course covers all aspects of normal midwifery.

**NSC 428: MATERNAL AND CHILD HEALTH NURSING PRACTICUM (2 Credits)** This course entails both the laboratory and clinical practice in Midwifery which is designed to reinforce knowledge and experience in the management of labour, care of mother and infant immediately after delivery and 24hours after. It also entails the management of emergencies during delivery and care of medical conditions associated with deliveries and family planning

**NSC 423: MANAGEMENT OF NURSING CARE SERVICES PRACTICUMS (2 Credits):**

The course enables the student utilize the principles and technique of management in health care settings. Opportunity is given for managing human, financial and other resources, at the primary, secondary, and tertiary levels of health care. Case studies of successful and failed private nursing enterprises. It enables the student utilize the principles and technique of teaching in health care settings. Opportunity is given for health education at the primary, secondary, and tertiary levels of health care. The course also provides opportunity to apply teaching concepts and theories in practice.

**NSC 427: HEALTH ECONOMICS: (2 Credits)**

The Course introduces students to the basis of costing of health care and services for effective and efficient delivery of same. Basic principles of economics are discussed.

## 500L

### FIRST SEMESTER

#### **NSC 422: TEACHING PRACTICE (2 Credits).**

The course enables the student utilize the principles and technique of teaching and management in health care settings. Opportunity is given for health education at the primary, secondary, and tertiary levels of health care.

Managing human, financial and other resources, case studies of successful and failed private nursing enterprises (4Weeks).

#### **NSC 421: NURSING ETHICS AND JURISPRUDENCE (2 Credits)**

This course is designed to enable the student identify nursing ethics as a component of medical ethics in her practice as a member of the health team. It introduces the student to the status and common law as they affect the nursing profession and nursing practice. It enables her develop a personal philosophy of nursing. Foundation of nursing Ethics (National and international) nursing ethics in Nigeria (problems and prospects), laws and regulations governing nursing practice in Nigeria, ethical considerations and dilemmas, nursing ethics as it relates to the health team, ethical/moral principles, professional ethics and constraints imposed by institutions, the health care system and individual rights: informed consent, abortion, dying and death, behavior control; and discussion of ethical dilemmas and the nurse as an advocate.

**Total Units: 20 units**

**NSC 511: COMMUNITY HEALTH NURSING (3 Credits)** The development of students' competence in planning, organization, and administration of community health forms the focus of this course. Occupational Health nursing, Public Health Nursing Administration,

#### **NSC 514: MATERNAL AND CHILD HEALTH NURSING IV (3 Credits)**

The course is continuation of NSC 428. It is designed to prepare students to recognize conditions which suggest deviation from normal to enable students identify abnormalities in pregnancy, labour, Puerperum and the newborn. It emphasizes the importance of prompt intervention in obstetric emergencies and relevance of quality assurance. It also highlights the role of nursing students in early diagnoses, appropriate interventions and referral as necessary.

#### **NSC 519: SEMINAR IN NURSING (2Credits)**

This course promotes the advancement of research in nursing. Seminar sessions involves Discussions and Presentations centers on knowledge of relevant Biological, Social and Psychological concepts and theories as would be needed in understanding contemporary issues in nursing. Discussions in the seminars centers on the application of the Biological, Social, Psychological and nursing theories and concepts in analyzing and discussing contemporary nursing issues. Completion of guided study in selected areas of nursing and related fields is also a mandatory part of the course

#### **NSC 517: RESEARCH PROJECT 1 (3 Credits)**

This course deals with scientific methodology of research and its application to midwifery practice. Emphasis will be placed on theory and methods of research and critical evaluation of research reports. Seminar sessions, discussions and presentation will center around relevant concepts and theories needed to understand contemporary issues. Students are required to present a research project in midwifery. They are also exposed to the preparation of budget for research project.

#### **NSC 518: MATERNAL AND CHILD CARE PRACTICUM (2Credits)**

This course entails both the laboratory and clinical practice, which is designed to enable the student transfer the theoretical knowledge of maternal and child health nursing, growth and development, child health and genetics to practice settings: It introduces students to Family care studies, domiciliary midwifery practice, National programme on immunization, Oral rehydration therapy.

#### **NSC 513: HEALTH EDUCATION (2Credits)**

The course is designed to introduce the student to the principles of education and educational methodology. It stresses the role of the Nurse as teacher and health educator. Principles of education, principles of teaching/learning philosophy; and

objectives of education in Nigeria. Relation of the national policy and philosophy of education to the education of nurses. Qualities of a teacher. Teacher/Learners interaction. The learning environment, the learner, deductive and inductive reasoning. Concepts of motivation and development of instructional objectives. Development of course content, methods of evaluation.

**NSC 512: COMMUNITY HEALTH NURSING PRACTICUM (2 Credits):**

This course entails both the laboratory and clinical practice community health nursing. The course affords the student the much-needed opportunity to put into use the organizational administrative knowledge of skills they have accumulated over the past 4 years of their study. It involves students' active participation in community-based activities.

**NSC 515: MEDICAL SURGICAL NURSING V (2Credits)**

At this level, students are exposed to special areas of Medical- Surgical Nursing with integration of body systems. Responding to emergencies and critical thinking on multiple systems will be the focus. This final course in Medical Surgical Nursing provides a unique opportunity for presentation of a series of case studies incorporating many of the disorders covered from 200 through 500 levels. Each case study leads students through scenarios where the clients experience problems in multiple body systems. At this level, students are expected to connect the concepts they have been learning throughout their course of study. It includes the following:

The content will expose the students to skills of assessment and management of specific environmental emergencies, including the concept of triage. Rehabilitation and end of life care will be emphasized. The role of the nurse as a member of interdisciplinary team to improve end-of life –care in order to facilitate a peaceful and comfortable death will be emphasized. It will also introduce the students to a comprehensive approach to pain management, symptom control and how to deal with related concerns of the dying patient and the family.

**SECOND SEMESTER**

**NSC 521: COMMUNITY HEALTH NURSING IV (3Credits)**

The course emphasizes the application of integral knowledge in problem solving viz: Identification of nursing principles in planning, execution and evaluation of special community nursing needs both locally and internationally. (For the public health nursing programme: Family Planning and MCH)

**NSC 522: COMMUNITY HEALTH NURSING PRACTICUM (2Credits)**

This course entails both the laboratory and clinical practice. It emphasized active participation in community-based activities.

**NSC 524: MATERNAL AND CHILD HEALTH NURSING (3Credits)**

This course emphasizes the understanding of students to skills needed to manage obstetric emergencies and operative interventions with the utilization of basic life saving skills.

**NSC 523: COUNSELING SKILLS IN NURSING (2Credits)**

Definition of counseling, care and support, types of counseling, pre-test, post- test, Primary and Secondary prevention, crisis management, problem solving, decision making, couple spiritual and pastoral: who needs counseling, rewarding listening skills, prevention and management of conflicts, Genetic counseling including sickle cell trait in marriage, Blood donation campaign, HIV infection etc, Case study.

**NSC 525: MATERNAL AND CHILD HEALTH NURSING PRACTICUM (2Credits)**

This course entails both the laboratory and clinical practice. Students are posted to various obstetric clinical settings to observe and conduct normal deliveries and assist with complicated deliveries for a period of 4-6 weeks. Health education in various stages of pregnancy and counseling are also provided.

**NSC 528: SEMINAR IN NURSING (SPECIAL) (3Credits)**

The course is designed to enable student identify issues and trends in nursing and health care. In-depth knowledge is derived through literature review and interaction with members of the health team. Case studies will also be presented. The techniques of development, presentation and discussion of ideas, topic and pertinent issues in Nursing will be highlighted.

The seminar sessions are expected to guide students to:

- (a) Plan, compose and present seminar papers on relevant topics.
- (b) Plan and organize seminar workshops.
- (c) Participate actively as discussants, secretaries, rapporteurs, and chairman at seminar/workshops.
- (d) Evaluate the achievement of workshops/seminars.

**NSC 527: RESEARCH PROJECT II (6 Credits)**

This course deals with scientific methodology of research and its application to community health nursing practice. Emphasis will be placed on theory and methods of research and critical evaluation of research reports. Students are required to present a research project in Public Health Nursing and also guided in the selected areas of their final project. They are also exposed to the preparation of budget for research project.

**ELECTIVES:** Any one from the list must be taken each semester:

**NSC 500: GERIATRIC NURSING :**( 4 Credits)

This is the care of elderly, promotion and maintenance of good health, nursing intervention when illness or any abnormal condition set in domiciliary and institutional care.

**NSC 501: RADIOLOGY/RADIOTHERAPY NURSING**

In this course, students learn the health problems associated with radioactivity and the role of the nurse in the circumstances.

**NSC 502: OPHTHALMIC NURSING** (4 Credits)

This course emphasizes care of the eye. Promotion and maintenance of ophthalmic care, Nursing care of ophthalmic injuries or eye surgery.

**NSC 503: ORTHOPAEDIC NURSING** (4 Credits)

History of orthopedics nursing, Nursing care of orthopedics injuries or conditions, e.g., fractures, bone tumors, etc.

**NSC 504: DERMATOLOGY NURSING:** (4 Credits)

The course deals with the normal properties of skin, abnormal state of skin; dangers of the abnormalities and the role of the nurse in the prevention, treatment and care of such abnormalities.

**NSC 505: GENETIC NURSING** (4 credits)

This course focuses on equipping the students with genetic nursing information for individuals, families and populations who are at risk for disease conditions with genetic implications. Clinical genetic topics to be covered will allow the students to apply the genetic/genomic information to their level of knowledge and nursing practice. Topics to be covered include: Genetic concepts, overview of genes, DNA and Chromosomal variations. Pedigree development, Risk assessment, Genetic counselling and application to nursing. Ethical, legal & social implications of genetic nursing will also be discussed.

**NSC 506: ORTHORHINOLARYNGOLOGY** (4 credits)

This course is aimed at preparing students for developing in-depth knowledge and skill in caring for those who have alterations in the function of their ears, noses and throats. It will include adequate knowledge of the anatomy and physiology of these organs. Students are to develop further knowledge and skill in utilizing the nursing process in the care.

**NSC 507: ANAESTHETIC NURSING** (4 credits)

This course is designed to expose students to principles and uses of anesthesia. It will also help them develop knowledge and skill in administering several of anesthesia agents. Types, sites, duration and complications of these agents will be examined. Students will build on the knowledge and skills to assist clients who require anesthesia.

**NSC 508: PERIOPERATIVE NURSING:** (4 Credits)

The course focuses on the needs of patients who require surgical care for the treatment of their ailments, students will be expected to develop and acquire knowledge and skill in pre, and post-operative period of client care.

**NSC 509: PAEDIATRIC NURSING** (4Credits)

Factors affecting the care of children. Health promotion in infancy and childhood, the nurses role in supporting the Health care of children. Understanding growth and development process. Emotional growth potential, intellectual growth potential physical growth potential.

**The Newborn-**The family and preparation for birth, the importance of New born period to later development. Immediate care at birth, the role of nutrition in growth and development. Infant problems related to gestation and birth. High risk infants and problems of the term infant. Nursing care of premature infants growth development and care during the first year. Immunological system and immunodeficiency disorders. Nursing problems with specific concern in infancy growth, development and care of the toddler and the preschool child. Growth, development and care during middle childhood growth development and care in puberty and adolescence.

**NSC 510: INTENSIVE CARE NURSING** (4 Credits)

Nursing care of critical condition such as premature baby, distressed newborn, in the adult, immediate post-operative care, any distress health condition that requires close and frequent monitoring, e.g. road traffic accident, heart attack, stroke etc.

**DEPARTMENT OF PHYSIOLOGY  
B.Sc. DEGREE PROGRAMME**

**ACADEMIC STAFF OF DEPARTMENT OF PHYSIOLOGY**

S/No	NAMES.	QUALIFICATIONS	RANK.
1	EZENWANNE, E.B	B.Sc. (1982) M.Sc. (1986) Ph.D (ABU)	Senior Lecturer
2	OBIKA, L.F.O.	B.Sc. (Ibadan) Ph.D (Cantab)	Professor
3	EBEIGBE, A.B.	B.Sc. (Ibadan), Ph.D (Glasgow)	Professor
4	IYAWA, V.I.	MBBS (Benin), Dip. Sport Med. Ph.D (London) FPSN	Professor
5	UGWU, A.C.	B.Sc. (Ibadan) M.Phil Ph.D (Glasgow)	Professor
6	IGHOROJE, A.D..A.	B.Sc. (Ibadan) Ph.D (Glasgow)	Professor
7	EBOMOYI, M.I.	B.Sc., M.Sc. (Ibadan) Ph.D (Benin) Cert. in Basic Computing (London)	Professor
8	AGOREYO, F.O..	B.Ds. M.Sc., Ph.D (Benin)	Senior Lecturer
9	AZUBIKE, C.O.	B.Med. Sc. MBBS, m.Sc., FMCP	Senior Lecturer
10	AJAYI, O.I.	AIMLS, FIMLS, M.Sc., Ph.D (Benin)	Senior Lecturer
11.	UCHE, O.K.	B.Sc., M.Sc., Ph.D (Benin)	Lecturer I
12.	OMOROGIWA A.	MBBS, M.Sc., Ph.D. (Benin)	Lecturer I
13	OMIGIE, M.I.	B.Ds. (2207)	Lecturer I
14	EBOJELE, F.O.	B.Ds. (2007)	Lecturer II
15	OGBONMWAN, E.E.	B.Ds. (2010)	Lecturer II
16	ONUYOH ADAITIRE, E.	B.Ds.	Lecturer II
17	OZONE, O.J.	B.Sc. (2008), M.Sc. (2013)	Lecturer II
18	AHIANTE, B.O.	B.Sc. (2008) M.Sc. (2013)	Lecturer II
19.	INNEH, C.A.	B.Sc. (2008), M.Sc. (2013)	Lecturer II

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20.	Dr. E.O. AIHIE	BSc.	Lecturer II
21.	ASOWATA, E.O.	B.Sc. (2009)	Graduate Assistant
22.	ARISHE, O.O.	B.Sc. (2009)	Graduate Assistant
23.	ILENWABOR, B.P.	B.Sc. (2009)	Graduate Assistant

**Technical Staff:**

24	AIKPITANYI- IDUTUA, R.O.	ANIMLS (1999)	Principal Medical Laboratory Scientist
25.	Osakue, J.O.	ANIMLS (1999) M.Sc. (2008)	Senior Medical Laboratory Scientist
26.	OSAYANDE, S.I.	B.Sc. (Hons.) (Physiology)	Laboratory Techn.II
27.	TAFAMEL, E.G.	B.Sc. (Hon)	Laboratory Techn.II
28.	DANIEL, O.	Pry. Six (1968) G.C.E. (1982)	Laboratory Supervisor
29.	WOGHIREN, E.I.	G.C.E. (1982)	Laboratory Supervisor
30.	OKOLO, E.O.	SSCE	Laboratory Supervisor

**Non-Academic Staff:**

31.	CHIAZOR, C.N.	OND (Secretarial) 1990, B.Sc. M.P.A (1999)	Snr. Conf. Secretary II
32.	OAMEN H.	SSCE, B.Sc. (Benin)	Senior Executive Officer
33	GUOBADIA.	SSCE, B.Sc. (Hons.)	Higher Executive Officer
34.	OFILI, J. U.	WASC, DIP. (Benin)	Executive Officer
35.	WILLIE, E.	SSCE, .B.Sc. (Benin)	Office Assistant

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## GENERAL INFORMATION

Physiology in a broad sense is the study of the normal functions of the living organism as opposed to non-living. Physiology is an enquiry into nature so as to gain an understanding into the underlying how, what and why of the physical and chemical mechanisms in a system. Its branch of human physiology is the basis of the study of medicine; and many physiologists have won the Noble Prize in Medicine. And because every disease is associated with a disorder of function, no physician can diagnose or treat patients intelligently without a good knowledge of the physiology of cells, organs and the organism as a whole.

## PHILOSOPHY, OBJECTIVES AND SCOPE

The B.Sc. programme in human physiology is designed to cater for adequate exposure in all areas of human physiology as well as take relevant courses in human anatomy, medical biochemistry, and pharmacology. The graduate will be able to serve as teachers and research workers in higher intuitions, research institutes, service laboratories in hospitals and industries.

## DEGREE PROGRAMME AND REQUIREMENTS

The degree programme will last three years for direct entry students and four years for students admitted through JAMB. To be eligible for admission to a degree of B.Sc. in Physiology, a candidate should have:

- a. Satisfied the normal University requirements.
- b. Satisfied the approved School of Basic Medical Science requirements in respect of work load, registration for courses and programme duration
- c. Satisfied the departmental requirements as contained below

## FOUR YEAR DEGREE PROGRAMME

**100 LEVEL COURSES:** AS DESCRIBED ABOVE (Page 17 - 22.)

### 200 LEVEL COURSES

#### FIRST SEMESTER

Course Code	Course Description	Course Credit
ANT 210	General Anatomy and Gross Anatomy of Upper Limbs	2
ANT 211	Gross Anatomy of Thorax	2
ANT 212	Basic Histology & Cytology	2
ANT 213	General Embryology	2
MBC 210	Introductory Biochemistry	2
MBC 211	Introductory Analytical Techniques	2
PHS 211	Introductory and General Physiology	2
PHS 212	Blood and Body fluid Physiology	2
PHS 213	Cardiovascular System	2
PHS 214	Respiratory Physiology	2
<b>TOTAL</b>		<b>20</b>

#### SECOND SEMESTER

Course Code	Course Description	Course Credit
ANT 220	Gross Anatomy of the Abdomen, Pelvis and Perineum	2
ANT 221	Gross Anatomy of Lower Limb	2
ANT 222	Systemic Histology I	3
ANT 223	Systemic Embryology I	3
MBC 220	Carbohydrate & Lipid Metabolism	3
MBC 223	Amino acid & Protein Metabolism	3
MBC 225	Protein Chemistry & Enzymology	3
PHS 221	Renal Physiology.	2
PHS 222	Gastrointestinal Physiology	2
PHS 223	Endocrinology & Reproduction	3

PHS 224	Temperature Regulation.	1
<b>TOTAL</b>		<b>27</b>

**TOTAL CREDIT FOR THE YEAR.....47**

### 300 LEVEL COURSES

Course Code	Course title	Course Credit
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#### FIRST SEMESTER

PHS 311	Renal, Fluid & Electrolyte Balance	2
PHS 312	Hypothalamo-hypophyseal System Physiology	2
PHS 313	Autonomic and Neurophysiology	3
PHS 314	Cardiovascular Physiology	3
ANA 311	Gross Anatomy of the Head and Neck	3
ANT 314	Neuroanatomy 1	2
CED 300	Introduction to Entrepreneurship	2
BOT 315	Biostatistics	2
	<b>Total</b>	<b>17</b>

#### 2ND SEMESTER

CSC 310	Introduction to computing	3
PHS 321	Animal Experimentation/Design of Experiment	3
PHS 322	Membrane Transport Mechanism	2
PHS 323	Comparative Environmental and Metabolic Physiology	2
PHS 324	Literature Review	1
PHS 325	Seminar	1
MCB 320	Clinical Biochemistry	3
MMB 321	Introductory Microbiology	1
PCO 320	Introductory Pharmacology	2
	<b>Total</b>	<b>20</b>
	<b>TOTAL CREDIT FOR THE YEAR</b>	<b>37</b>

### 400 LEVEL COURSES

Course Code	Course title	Course Credit
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#### FIRST SEMESTER

PHS 410	Cellular Physiology	2
PHS 412	Advanced Cardiovascular Physiology	3
PHS 413	Quantitative Pharmacology	3
PHS 414	Neuroscience 1	2
PHS 415	Advanced Pulmonary Physiology	3
PHS 416	Advanced Gastrointestinal Physiology	3
PHS 417	Advanced Renal and Body Fluids	3
	<b>Total</b>	<b>19</b>

#### SECOND SEMESTER

PHS 421	Advanced Endocrine and Reproduction	3
PHS 422	Neuroscience 11	2
PHS 423	Sensory Physiology	2
PHS 424	Seminar	3
PHS 425	Project	6
	<b>Total</b>	<b>16</b>

**TOTAL CREDIT FOR THE YEAR.....35**

### COURSE DESCRIPTION

#### 200 LEVEL

#### FIRST SEMESTER

#### MBC 210: INTRODUCTORY BIOCHEMISTRY (2 Credits).

Short history and Definition of Biochemistry. Importance of Biochemistry to medicine and other scientific disciplines. The living cell. Organization and Molecular architecture. Types of cell and their characteristics. Structure and organization of Biological membranes. Biomolecules and the origin of life. Chemistry of Biomolecules. Carbohydrates Classification, structure distribution and functional role of named examples. Chemical properties and reactions. Essential fatty acids, Eicosanoids fat-soluble vitamins – Structure and functions. Peptide bonds and hierarchy of protein structure Nucleic acids. RNA and DNA. Structure/function of enzymes. Zymogens Active site and specificity of enzymes. Inhibition and Activation of enzymes. Factors affecting enzyme

catalyses reaction. Allosteric enzymes. Isoenzymes. The Concepts of Aviaminoses, Hypovitaaminoses and Antivitamins. Vitamins and their Co-enzyme function. Biomedical importance of vitamins.

**MBC 211: INTRODUCTORY ANALYTICAL TECHNIQUES** (2 Credits).

Measuring techniques in cell fractionation, Chromatography, Spectrophotometry, Electrophoresis and Calorimetry. Methods of studying the cell. Microscopy, histochemistry and cytochemistry. Autoradiography Vs. Scintillation counting. Cell fractionation methods including differential Centrifugation and Gradient centrifugation. Molecular hybridization including Paul Doty experiments. Acids, and bases. Buffers and buffer systems. Henderson Hassel bach equation. Titration curves of acids and bases. End point indicators. zwitterions. isoelectric pH nucleic acid.

**ANT 210: GENERAL ANATOMY AND GROSS ANATOMY OF THE UPPER LIMBS** (3 Credits)

The general descriptive terms as used in the study of the human body would be introduced. The techniques used to study the human body would also be introduced. The normal anatomical position and directional movement of body parts would be introduced.

The gross anatomy of the upper limbs: pectoral region, Axilla, Brachial plexus, scapular region, brachium, Antebrachial fossa and its Anastomosis, carpal tunnel, Hand, Nerve injuries, osteology and joint of the upper limb, the vascular anastomosis and lymphatic drainage of the breast and upper limb would be studied.

**ANT 211: GROSS ANATOMY OF THORAX** (2 Credits)

Description: for the thorax: The sternum and ribs, thoracic vertebrae, Heart and great vessels, thoracic duct, dissection of the entire thoracic region, Azygos system of vein, intercostals spaces, Mediastinum, lungs bronchiopulmonary tree and segments thoracic diaphragm, Aorta and respiratory movement.

**ANT 212: BASIC HISTOLOGY AND CYTOLOGY** (2 Credits)

Description: Structure and the function of the cell, general histology and basic tissues of the body. Preparation of tissues for microscopy, is a practical oriented course that is studied along side with the theoretically based lecture.

**ANT 213: GENERAL EMBRYOLOGY** (2 Credits).

General consideration of the male and female Reproductive organs. Gametogenesis, fertilization, implantation, cleavage, the morula, the blastocyst formation of the primitive streak, the Bilaminar and trilaminar germ disc. Development of tissues and organ systems of the embryo, the chorionic and amniotic cavities, foetal membranes, placental formation and functions. The molecular regulation in differentiation of tissues and organs and in the establishment and patterning of the body axis. Birth defects, chromosomal and genetic factors. Twins and twin defects, general characteristics of the embryonic and foetal periods.

**PHS 211: INTRODUCTORY AND GENERAL PHYSIOLOGY** (2 Credits)

Cell physiology, Physicochemical principles, Body fluids and Blood transport: Control systems. Introduction to ANS. Excitable and contractile Cells.

**PHS 212: BLOOD AND BODY FLUID PHYSIOLOGY** (2 Credits).

Introduction and definition of body fluids and body fluid compartments. Regulation of body fluid volumes Physiological variation of body fluid volumes. Techniques for quantifying various body fluid volumes.

Blood: Functions of blood and classifications of blood cells. Erythropoiesis. Haematological indices. Haemoglobin genotype and Blood groups. Immunology and cell defence.

**PHS 213:        **CARDIOVASCULAR SYSTEM** (2 Credits)**

Definition and functions of the cardiovascular system, Cardiac muscle Cardiac myoelectrophysiology, cardiac cycle, Circulation of blood: cardiac output and regulation. Blood pressure. Haemodynamics and microcirculation. Pulmonary, Cerebral, Coronary, Splanchnic and muscle circulation, Shock and cardiovascular changes in exercise.

**PHS 214:        **RESPIRATORY PHYSIOLOGY** (2 Credits).**

Definition and functions of the respiratory system, Physiologic anatomy of the respiratory system. Respiratory dynamics and work. Pulmonary ventilation: Lung volumes and capacities, spirometry. Mechanism and mechanics of breathing, Lung surfactant, pulmonary circulation. Gas exchange and Gas transport. Oxygen Haemoglobin dissociation curve. Hypoxia and Dyspnoea. Respiratory changes in exercise and barometric changes. Control of breathing.

**SECOND SEMESTER**

**ANT 220:        **GROSS ANATOMY OF THE ABDOMEN, PELVIS AND PERINEUM** (2 Credits)**

Abdomen: subdivision of the abdominal region and their applied anatomy, Anterior Abdominal wall, inguinal region, posterior abdominal wall, stomach, spleen, liver, gall bladder, pancreas, small and large intestine, celiac trunk, biliary apparatus, intra and supra colic compartment and recesses, appendix renal and suprarenal gland, dissection of the entire abdominal region for proper understanding of the entire region.

Pelvis & perineum: pelvic cavity wall and diaphragm. Pelvic visceral like the urinary bladder, uterus, testes, ovary, etc). Perineum, boundaries and subdivisions. Perineal pouches, external and internal genitalia, ischiorectal fossas. General dissection of the pelvis and perineum region.

**ANT 221:        **GROSS ANATOMY OF THE LOWER LIMBS** (2 Credits)**

The lower limb lumbar and lumbosacral plexus, femoral triangle, thigh, gluteal region, leg, foot, nerves injury and their applied anatomy of lower limb popliteal fossa, Genual and ankle joints, Arch of the foot, Osteology and joins of the lower limb. Vascular Anastomosis and lymphatic drainage of the lower limb.

The theoretical aspect to go along side with the dissection of these regions in cadaver.

**ANT 222:        **SYSTEMIC HISTOLOGY I** (3 Credits)**  
Systemic histology of CVS, GIT, musculo skeletal.

**ANT 223:        **SYSTEMIC EMBRYOLOGY 1** (3 Credits).**

The diaphragm, the cardiovascular, respiratory and gastrointestines systems. Development of the adrenal gland, the liver, the pancreas and the spleen. The urogenital, musculo-skeletal and integumentary system. The limbs, the molecular regulation and associated developmental anomalies of the systems.

**PHS 221:        **RENAL PHYSIOLOGY** (2 Credits).**

Definition and functions of the kidney. Physiologic anatomy of the kidney. Glomerular filtration. Tubular functions. Urine formation:- Dilute and concentrated Urine, Counter current mechanism, Plasma clearance, renal autoregulation, ECF regulation, Acid Base balance, Renin-Angiotensin system.

**PHS 222:        **GASTROINTESTINAL PHYSIOLOGY** (2 Credits)**

Definition and functions, Physiologic anatomy and Innervations of the GIT, Mastication, Deglutition, Salivary gland, Digestion and food absorption, Movement and Stomach emptying, Movements of the GIT, Vomiting and defecation, GIT secretions and juices, Liver and General metabolism (BMR)

**PHS 223: ENDOCRINOLOGY AND REPRODUCTION**

(3 Credits)

Definition and functions, Definition of Hormones, Methods of Measurement, Types and mechanism of Actions, Regulation, Physiologic anatomy, Hypothalamus-Hypothalamic releasing factors, Hypothalamic Nuclei, Hypothalamo-hypophyseal system, Pituitary gland, Tropic Hormones, GIT and other local hormones.

Structure and functions of male and female reproductive organs, Androgens, Spermatogenesis and fertility. Infertility in male. Oogenesis, Sexual cycle and hormonal regulations. Fertilization, Pregnancy and Parturition, Fertility and infertility in female. Family planning.

**PHS 224 TEMPERATURE REGULATION (1 Credit)**

Body temperature and the environment, Mechanisms of heat Exchange, peripheral thermoreceptors, central thermoreceptors, hyperthermia, and hypothermia, Fever, heat Exhaustion and Heat stroke.

**MBC 220: CARBOHYDRATE AND LIPID METABOLISM**

(3 Credits).

Structural inter-relationships of sugars. Stereochemistry of sugars. Hexoses, Pentoses, Disaccharides, Starch, Glycogen, and Polysaccharides. Methods of identifying sugars. Carbohydrate metabolism. Digestion and absorption. Glycolysis. TCA Cycle and Pentose Phosphate pathway. Control of Glycolysis. TCA Cycle and Pentose Phosphate pathway. Glyoxylate Pathway. Gluconeogenesis. Glyoxylate Pathway. Gluconeogenesis. Glycogenolysis and Glycogenesis. Mitochondrial electron transport chain and Oxidative Phosphorylation. Energy generation and storage in Biological systems.

Disorders of Carbohydrate Metabolism. The pyruvate and  $\alpha$  - Ketoglutarate complexes and their regulation. Metabolism of lipids. Digestion and absorption. Role of Lipoproteins in lipid transport. Metabolism of lipoprotein in health and disease. Triacylglycerol oxidation and oxidation of fatty acids. Storage and

mobilization of energy stores in adipocytes. Ketone bodies and Ketosis.

Interrelationship of fatty acid and carbohydrate biosynthesis/oxidation. Biological importance of Eicosanoids. glycolipids and sphingolipids. . The Chemistry and metabolism of Steroids and Steroid hormones

**MBC 223: AMINO ACID AND PROTEIN METABOLISM**

(3 Credits).

Structure of amino acids. Peptide bonds. Metabolism and transport of amino acids and proteins. Digestion and absorption. Gammaglutamyl cycle. Detailed treatment of mechanism of deamination, transamination glutamate dehydrogenase, glutamate and glutamine synthesis. The biochemical and clinical importance of these enzymes. Fate of Carbon skeleton. Urea cycle. The concepts of nitrogen balance. Nitrogen turnover in cells. Degradation of amino acids. Ketogenic and glucogenic amino acids. Aromatic acid degradation and inborn errors of metabolism, metabolism of uric acid Integration and Compartmentation in intermediary metabolism. Metabolism of one carbon compounds.

**MBC 225: PROTEIN CHEMISTRY AND ENZYMOLOGY**

(3 Credits).

A review of the Structural Characteristic of proteins. Determination of N and C terminal amino acid. Amino acid sequence and sulphide bridges. Determination of Protein Structure by X- Crystallography. biological functions of proteins. The oxygen transporting proteins (haemoglobin and myoglobin) connective tissue protein. Collagen and elastin. Structure /function relationships.

Enzymes. Isolation and Purification from animals and plants. And Microorganism. Zymogens and Isoenzymes. Characteristics of Enzymes. Kinetics of enzyme catalysed reaction. Allosterism. Importance of enzymology in Medicine. Coenzymes and relationships to vitamins.

### 300 LEVEL

#### FIRST SEMESTER

#### **PHS 311: RENAL, FLUID & ELECTROLYTE BALANCE** (2 Credits).

Functions of the kidney, Morphology of tubule and Tubular functions. Renal function tests Mechanism of renal Excretion of different electrolytes ( H<sup>+</sup>, Na<sup>+</sup>, K<sup>+</sup> and Cl<sup>-</sup>) and ECF Balance.

#### **PHS 312: HYPOTHALAMO-HYPOPHYSEAL SYSTEM PHYSIOLOGY** (2 Credits).

#### REVIEWED CURRICULUM

\*Diagrammatic illustration of the relationship between the hypothalamus and the pituitary gland.

\*Physiologic morphology of the hypothalamus and the pituitary gland (anterior and posterior pituitary).

\*Development (embryology) of the hypothalamo pituitary axis.

\*Histology of the hypothalamo-pituitary axis

Cell types of the anterior pituitary gland – functions, distribution and staining characteristics.

\*Blood supply of the hypothalamo-pituitary axis.

Hypothalamo-hypophyseal portal system.

\*Nervous pathways of the hypothalamo-hypophyseal axis.

Hypothalamo-hypophyseal nerve tract.

\*Functions of the hypothalamus.

Hypothalamic neurohormones and their functions

\*Hormones of the Posterior pituitary gland – site and mechanism of synthesis, transport, storage and release.

\*Feedback mechanisms in the hypothalamo-hypophyseal system.

#### **PHS 313: AUTONOMIC AND NEUROPHYSIOLOGY** (3 Credits).

Physiologic anatomy of the ANS. Functions of the ANS Difference and Similarities between ANS and somatic nervous system. Divisions of the ANS. Characteristics of the Sympathetic and the

Parasympathetic system. Similarities and differences. ANS effects on major organs of the body, Pharmacology of the ANS, ANS reflexes and Control centers.

Classification of Nerves, Sensory organs and receptors, Modalities of sensations. Reflexes:-reflex arc, act and action. Myotatic reflexes, postural reflexes, Mono and polysynaptic reflexes. Organization of the Nervous system, Spinal cord. Brain stem and the Brain and localization of functions, Sensory and Motor Tracts. Pyramidal and Extra Pyramidal Tracts. Basal ganglia, Thalamus and Hypothalamus, Cerebellum, Testicular formation and Limbic system, Alertness, Sleep, Memory and learning.

#### **PHS 314: CARDIOVASCULAR PHYSIOLOGY** (3 Credits).

Cardiac myoelectrophysiology, cardiac cycle, Circulation of blood: cardiac output and regulation. Blood pressure. Haemodynamics and microcirculation. Pulmonary, Cardiovascular changes in Exercise Cardiorespiratory of the newborn Regulation of intracellular calcium concentration Cardiac integration and autonomic control of the heart; Excitation contraction coupling in vascular smooth muscle; Vascular and autonomic receptors; Pulmonary circulation and architecture of the pulmonary vasculature; Structural and functional adaptation; Individual circulations; Cardiovascular actions of histamine, the Renin/angiotensin system and, Vasodilators drugs: nitrovasodilators, atrial natriuretic peptides,

#### **PHS 321: ANIMAL EXPERIMENTATION/DESIGN OF EXPERIMENT** (3 Credits).

Laboratory animal experimental techniques in physiology - Past and present.

Basic instrumentation, Tissue preparations. Investigation techniques and Design of Experiment Basic skills of Proposal writing. Data management.

**PHS 322: MEMBRANE TRANSPORT MECHANISM**  
(2 Credits).

Types and theories, Basic mechanisms of operation. Roles of enzymes and modulators. Membrane receptors, Second Messengers, Signal transduction pathways, How and why cells communicate with each other. Introduction of the concept of the body as a whole organism in balance involving both inter and intracellular communication; Concept of homeostasis; Mechanism of intercellular communication; Roles of ions and ionic movements in cellular function; Neurotransmitters and drugs acting on peripheral neurotransmission; cholinergic, adrenergic and non-cholinergic, non-adrenergic transmission.

**PHS 323: COMPARATIVE ENVIRONMENTAL AND METABOLIC PHYSIOLOGY** (2 Credits).

Barometric and physiological changes. Different Environmental changes exposures and safety methods and devices. Different health hazards associated with adverse environmental changes. Basic Metabolic Rate, Measurement and Factors influencing it and Regulation

**PHS 324: LITERATURE REVIEW** (1 Credits).

Literature search. Library use and Online Library services. Internet Resources and Various Internet search engines. Literature Citation methods.

**PHS 325: SEMINAR** (1 Credits).

Seminar topics will be assigned as may be determined by the department.

**MMB 321: INTRODUCTORY MICROBIOLOGY** (1 Credits).

History, morphology, growth and nutrition. Classification and identification of bacteria. Bacterial genetics, bacteriophages, viruses, infection and resistance to infection. Sterilization and disinfection. Antimicrobial agents. Introduction parasites and fungi.

**PCO 320: INTRODUCTORY PHARMACOLOGY** (2 Credits).

History of Pharmacology and its development. Introduction to pharmacokinetics; drug absorption and bioavailability. Drug metabolism, pharmacogenetics. Effects of disease on drug kinetics. Drug in pregnancy and the extreme age. Pharmacodynamics; dose-response relationships, LD<sub>50</sub> ED<sub>50</sub> and TD<sub>50</sub>. Therapeutic index; introduction of new drugs, clinical trials; adverse drug reactions and adverse reaction surveillance.

**400 LEVEL**

**FIRST SEMESTER**

**PHS 410: CELLULAR PHYSIOLOGY** (2 Credits).

Cell membranes and transmembrane transport of solute and water, Membrane permeability barriers, Ionic equations, Resting membrane potential, Action potential, Synaptic transmission, Membrane receptors, Second Messengers, Signal transduction pathways, How and why cells communicate with each other. Introduction of the concept of the body as a whole organism in balance involving both inter and intracellular communication; Concept of homeostasis; Mechanism of intercellular communication; Roles of ions and ionic movements in cellular function; Neurotransmitters and drugs acting on peripheral neurotransmission; cholinergic, adrenergic and non-cholinergic, non-adrenergic transmission.

**PHS 412: ADVANCED CARDIOVASCULAR PHYSIOLOGY**  
(3 Credits).

Gross structure of the heart and blood vessels; Cardiac muscle and valve actions; Microscopic structures of the arterial wall Venous structures and pattern of distribution; fenestrated and sinusoid capillaries and endothelial transport. Cardiovascular reflexes; Excitation contraction coupling in cardiac muscle, Basic electrophysiology of cardiac muscle. Regulation of intracellular calcium concentration Cardiac integration and autonomic control of the heart; Excitation contraction coupling in vascular smooth muscle; Vascular and autonomic receptors; Pulmonary circulation and architecture of the pulmonary vasculature;

Structural and functional adaptation; Individual circulations; Cardiovascular actions of histamine, the Renin/angiotensin system and the eicosanoids, Vasodilator drugs: nitrivasodilators, atrial natriuretic peptides, phosphodiesterase inhibitors. Inhibitors of L-type voltage-operated calcium channels, and endothelium-derived nitric oxide: mechanisms of action of the agents and their role in the treatment of hypertension and angina.

**PHS 413: QUANTITATIVE PHARMACOLOGY** (3 Credits).

Receptors-structure of receptors, classes of receptor structure and relation to function. Classification of receptors; Receptor-ligand interactions; theories of ligand receptors interactions agonists/antagonists; chemical basis of interactions. structure activity relationships, calculation of binding parameters, dose-response relationships, Calculation of pD<sub>2</sub> values; competitive and non-competitive antagonism; ligand selectivity, measurement and calculation of pA<sub>2</sub> values; Schild plots, receptor reserve, Receptor effect coupling/ signal transduction, ion channels, G-proteins, Camp, Ca<sup>2+</sup>, protein kinases.

**PHS 414: NEUROSCIENCE 1** (2 Credits).

Structure and function of synapses; Synaptic transmission in cholinergic, adrenergic and NANC nerves; structure and function of the neuronal pathways of the autonomic and somatic nervous systems; drugs which interfere with acetylcholine, norepinephrine and other transmitters at their receptors on the various effector organs; Synthesis release and breakdown of neurotransmitters.

**PHS 415: ADVANCED PULMONARY PHYSIOLOGY**  
(3 Credits).

Intrapulmonary and intrapleural pressures; Gas laws, ventilation/perfusion ratios, Compliance; Elasticity; Surface tension; Surfactant; Mechanics of breathing; Gas exchange; Brain stem; Respiration centers; Central and peripheral chemoreceptors; Haemoglobin and oxygen transport;

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Carbondioxide transport and acid- base balance; high altitude and respiratory functions; Respiratory disorders.

**PHS 416: ADVANCED GASTROINTESTINAL PHYSIOLOGY** (3 Credits).

Structures of the GIT, Extrinsic and intrinsic innervations; enteric nervous system; Digestion and absorption; Secretions, Motility; Exocrine pancreases; Neuro-endocrine regulation of the GIT functions; GIT disorders.

**PHS 417: ADVANCED RENAL AND BODY FLUIDS**  
(3 Credits).

Physiologic anatomy of the kidney, renal blood vessels, renal tubes; Ultrafiltrate and regulation of Glomerular filtration rate; Tubular reabsorption; Counter-current multiplier system. Renal plasma clearance; Electrolyte and Acid-base balance; Control of body fluid osmolality and volume; Clinical applications

**SECOND SEMESTER**

**PHS 421: ADVANCED ENDOCRINE AND REPRODUCTION** (3 Credits).

Endocrine glands; Mechanism of hormone actions; Classifications of hormones; cAMP as second messenger; Ca<sup>2+</sup> as second messenger, Pituitary gland and relationship with the hypothalamus; Pancreas and other endocrine; Sexual reproduction; Endocrine control of reproduction, Fertilization and infertility; Pregnancy and Parturition. Birth control and methods

**PHS 422: NEUROSCIENCE 11** (2 Credits).

Organization of the cerebra. Cerebral lobes; Sensory and Motor Cortex; Cerebral internalization; Aphasias, Limbic system and emotion; Cranial and spinal Nerves; Spinal cord; Tracts; Motor control by cortex; Cerebellum and Basal ganglia; Central control of ANS.

**PHS 423: SENSORY PHYSIOLOGY** (2 Credits).

Receptor characteristics, cutaneous sensations, Taste and Smell; Vestibular apparatus and Equilibrium; Neural auditory pathways;

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Hearing impairments; Vision; Refractive Errors and correction; The Retina; Neural Processing of Visual information

**PHS 424: SEMINAR** (3 Credits).

Topics as may be assigned by the department

**PHS 425: PROJECT** (6 Credits).

**A SUMMARY OF THE CREDIT LOAD FOR THE PROGRAMME**

LEVEL	100	200	300	400	TOTAL
CREDITS	50	47	37	35	169

**DEPARTMENT OF PHYSIOTHERAPY  
SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL SCIENCE**

**BACHELOR OF PHYSIOTHERAPY (BPT) FIVE YEAR DEGREE PROGRAMME  
ACADEMIC STAFF**

S/NO	NAMES	QUALIFICATION	POSITION
1.	Dr. Kayode I. Oke	BMR(PT); MSc; Ph.D	Senior Lecturer/ Ag. Head of Department
2.	Idowu Opeyemi A.	BMR(PT); MSc	Assistant Lecturer
3.	Rev(Sis) Fawole Henrietta O.	BSc; MSc	Assistant Lecturer

**ADMINISTRATIVE STAFF**

S/No	NAMES	QUALIFICATION	POSITION
1	Mr. Osunbor Nosa	HND. Business Administration/Management	Higher Executive Officer
2	Mrs Caroline Okoagwa	HND. Secretarial Admin.	Confidential Secretary I
3	Miss Omoruyi Rachel	SSCE, NECO.	Clerical Assistant
4	Sylvanus J. Juliet	SSCE, NECO	Clerical Assistant

**Preamble**

The University of Benin is one of the first generation Universities in Nigeria which is providing leadership in academic training and manpower development in Nigeria and even beyond.

Furthermore, the University of Benin is well and most properly situated to provide training of manpower in one of the major health care professions, Physiotherapy, which she was not offering as a course of training before now.

The location of the University of Benin as the first generation Federal University in the South-South geopolitical zone will make starting a training programme in physiotherapy a unique and novel development. The addition shall make the University continue to maintain her leadership in manpower development and economic empowerment in Nigeria as this training programme is currently not available in any other in the zone.

The need to train physiotherapists as members of the health care professions has become more important than ever judging by the present global epidemiological shift from infectious to chronic diseases making rehabilitation very relevant. Also, the divergent major roles physiotherapists now play not only in the hospital setting, but also in the industrial and educational settings, sports organizations and physical fitness programme has made their relevance more important than ever before.

- iii) Sports, Physical Fitness and Health promotion Facilities.
- iv) Industrial workplace and other occupational environments.

- (b) To evaluate physical ailments and disabilities, plan and carry out a programme of treatment according to the patient's clinical state.
- (c) To recognize the role of the Physiotherapist in Health Care delivery in the community and in the Health Team.
- (d) To participate in clinical research with others as a means of further study and professional enhancement.
- (e) To acquire, develop and maintain rapport with professional colleagues, patients, their relatives and members of the Health Care Team.
- (f) To acquire, a sense of commitment to patients and the profession at all times.
- (g) To acquire knowledge in health policies, health management, global health issues and socio-cultural health issues.

### **Justification for Physiotherapy Training Programme Review**

There is a paradigm shift in the study and management of disease patterns globally. Non-infectious chronic diseases are gradually more prevalent than infectious diseases. This is as a result of advanced medical care and improved awareness.

The leading cause of morbidity and mortality according to the World Health Organization is now chronic disease such as cardiovascular disease, musculoskeletal and neuromuscular diseases. Consequently, Physiotherapists (PTs) now have more roles to play for people needing rehabilitation. Prior to this period, PTs participation in the management of disease at cellular level was limited. Intervention at this level is generally handled by physicians and is often pharmacologic or surgical in nature. Physiotherapy in recent times centers on rehabilitation of movement disorders with the knowledge base referred to as patho-kinesiology.

Physiotherapists are in great demand for the management and rehabilitation of patients who have suffered incapacitating illness, diseases and injuries. Physiotherapy is now considered a major part of secondary and tertiary rehabilitative care with involvement in restoring health, alleviating pain; preventing the onset of impairments, functional limitations, disabilities or changes in physical function and health status resulting from injury and disease.

Furthermore, more entrepreneurship is ensured because they can create jobs for themselves and employ others.

It is believed that commencement of physiotherapy training programme in the University of Benin at this time will go a long way to entrench the key points in its mission statement which is to develop the human mind, to be creative, innovative, research oriented, competent in areas of specialization, knowledgeable in entrepreneurship and dedicated to service.

### **Objectives**

The general objectives of the Physiotherapy programme is to train Physiotherapy Professionals equipped with adequate theoretical Knowledge, clinical skills, sense of purpose and devotion to patient care.

The specific objectives are:

- (a) To produce Physiotherapists who will be able to work in:-
  - i) Hospitals, Rehabilitation facilities and other Health Establishments as members of the Health Team.
  - ii) Physiotherapy Training Institutions, Research Centres and other Academic environments after undergoing relevant postgraduate training.

### **Vision of the Department**

The vision of the department is to be a reference centre for the training and education of highly competent physiotherapists with necessary knowledge, skills, critical thinking, behaviour and attitudes to pursue their profession as physiotherapists and managers in all the ramifications of physiotherapy and health care.

### **Philosophy**

The Philosophy is to train and produce highly knowledgeable and skilled Physiotherapist who will continue to search for more knowledge and professional skill and apply the same for treatment, rehabilitation, prevention, health promotion and other health needs of the patients and the community using Physiotherapy modalities

### **NOMENCLATURE.**

This shall be a professional unclassified physiotherapy degree programme leading to the award of Bachelor of Physiotherapy. (B.Physiotherapy)

### **Basic Admission Requirements**

- (a) **University Matriculation Examination (UME)**
  - (i) Candidates for admission into the programme must have a minimum of five (5) credit passes in Biology, Chemistry, Physics, Mathematics and English Language at Senior Secondary School Certificate Examination (SSCE), or General Certificate of Education (GCE 'O' Level), or National Examination Council (NECO) Certificate or the equivalent.
  - (ii) In addition to the above, the candidate must have acceptable score in the University Matriculation Examination (UME) conducted by JAMB.
- (b) **Direct Entry**

(i) Candidate for direct entry, in addition to the above ordinary level credits, must have passes in Chemistry, Physics and one other Sciences subject at the Advanced Level of General Certificate of Education (GCE 'A' Level) or its equivalent.

(ii) Graduates with a minimum of second class lower division in the Sciences from recognized universities can be admitted.

**Duration of Programme**

The Physiotherapy degree programme shall normally be for minimum of 5 years for candidates admitted to 100 level of study; and 4 years for candidates admitted to the 200 level of study, and shall be for maximum of 7 and 8 years respectively. Candidates shall graduate with unclassified degree as pass or pass with distinction.

**EXAMINATIONS AND AWARD OF DEGREE: B.PT COURSE EXAMINATION REGULATIONS**

1. A minimum of 75% attendance in all courses (Theoretical and practical) is required for all candidates. A student shall only be allowed to sit for examinations in a course, provided he has fulfilled the above requirements. A duly signed attendance sheet for the clinical by the course instructor/co-ordinator will be required prior to the final examination.
2. The examination shall be conducted as prescribed by Senate. The examination shall comprise of theory, practical and oral examinations.
3. The pass mark for all professional courses (College courses) shall be 50. In addition candidates must have a minimum of C (50%) in all practical and clinical examination. A student cannot pass any professional course without a 50% score in the practical/clinical.
4. The minimum number of credits required to remain in the school and to move to the next level is 22 credits (including GST courses), whilst the minimum number of credits required to remain in the school on probation is 11 credits. The total number of credits required to graduate shall be 180, including GST credits, and 150 for a direct entry 4 years course.
- 5(a). Any candidate who fails in 1 or 2 courses at the end of the 4<sup>th</sup> year shall resit the course at the next available opportunity. (Failure at the resit means that the candidate shall repeat the year.)

- (b). Any candidate who fails in more than 2 courses at the end of the 4<sup>th</sup> year shall repeat the year.
6. Before a candidate can graduate he shall normally have passed all prescribed courses in the curriculum both inside and outside the College.
7. When for valid reasons (e.g., Medical) a student is unable to complete all the prescribed requirements for courses in which he/she formally enrolled, he/she may on the recommendation of the Head of Department be awarded an incomplete grade (I). Such incomplete grade will normally be redeemed when the department certifies that all prescribed requirements have been satisfied.
12. Each professional year shall be weighted thus:
 

Part II (Professional Year I)	-	25%
Part III (Professional Year II)	-	25%
Part IV (Professional Year III)	-	25%
Part V (Professional Year IV)	-	25%
		= 100%
13. A candidates who has satisfactorily completed all requirements shall be awarded professional degree s indicated below:

Mark range	Professional degree/grade
70% - 100%	= A - Pass with Distinction
60% - 69%	= B - Pass with Credit
50% - 59%	= C - Pass

The 100level students of physiotherapy will spend their first year in the faculties of life science and physical science and the pass mark at this level shall be 45%. 45% shall be the pass mark for other non-departmental courses at subsequent levels.

**Attainment levels**

The degree shall be unclassified. Excellence shall be recognized through the awards of distinctions and prizes.

**CLINICAL AFFILIATION SCHEME**

Students in their 4<sup>th</sup> year will partake in Clinical Affiliation Scheme for a period of 6 weeks during the holiday in a suitable hospital as may be directed by the department.

Students will be expected to complete a logbook, which will be taken and rated by the supervising clinician at the end of the scheme. The grading will be 10% of the in-course mark for the succeeding year.

**SYNOPSIS OF COURSES FOR BACHELOR OF PHYSIOTHERAPY DEGREE.**

**100 LEVEL (1<sup>ST</sup> YEAR) COURSES**

<b>FIRST SEMESTER</b>	
<b>COURSE CODE</b>	<b>COURSE TITLE</b>
CHM 111	General Chemistry I
CHM 113	Organic Chemistry I
PHY 111	Mechanics, Thermal Physics & Properties for Matter
PHY 113	Vibrations, Waves & Optics
PBB 111	Diversity of Plants
AEB 111	Introductory Zoology
GST 111	Use of English I
GST 112	Philosophy & Logic
BMS 111	Elementary Mathematics
<b>TOTAL:</b>	
<b>SECOND SEMESTER</b>	
CHM 122	General Chemistry II
CHM 124	Organic Chemistry II
PHY 109	Practical Physics
PHY 124	Electromagnetic & Modern Physics
PBB 122	Plant form & Function
AEB 122	Functional Zoology
GST 121	Use of English II
GST 122	Nigerian People & Culture
GST 123	History & Philosophy of Science
<b>TOTAL</b>	

All Course are Core at this Level                      Total credits for the session    50

**200 LEVEL (2<sup>ND</sup> YEAR) COURSES**

<b>COURSE NO.</b>	<b>COURSE TITLE</b>	<b>CREDIT UNIT</b>	<b>TYPE</b>	
PHS 211	Introductory and General Physiology	2	Compulsory	1
MBC 210	Introductory Biochemistry	3		
		2	Required	1
ANT 210	General Anatomy and Gross Anatomy of the Upper Limbs	3		
		2	Compulsory	1
ANT 211	Gross Anatomy of the Thorax	2	Compulsory	1
PHS 212	Blood and Body fluid Physiology	2	Compulsory	1
STAT 211	Basic Statistics	2	Required	1
ANT 212	Basic Histology and Cytology	2	Compulsory	1
ANT 213	General Embryology	2	Compulsory	1
PHS 213	Cardiovascular System	2	Compulsory	1
PHS 214	Respiratory Physiology	2	Compulsory	1
CSC 110	Introduction to computer	2	Compulsory	1
<b>Total Credit Units</b>		<b>22</b>		
<b>SECOND SEMESTER</b>				
ANT 220	Gross anatomy of the abdomen, pelvis and perineum	2	Compulsory	2
ANT 221	Gross Anatomy of the lower limb	2	Compulsory	2
ANT 223	Systematic Embryology 1	3	Required	2
MBC 220	Carbohydrate & Lipid Metabolism	3	Required	2
MBC 223	Amino acid & protein metabolism	3	Compulsory	2
MBC 225	Protein Chemistry & Enzymology	3	Required	2

PHS 221	Renal Physiology	2	Required	2
PHS 222	Gastrointestinal Physiology	3	Compulsory	2
PHS 223	Endocrinology & Reproduction	2	Compulsory	2
PHS 224	Temperature Regulation	1	Required	2
STAT 240	General Applied Statistics	2	Required	2
PSY 211	Developmental psychology	2	Required	2
<b>Total Credit Units</b>		<b>28</b>		

**300 LEVEL (3<sup>RD</sup> YEAR) COURSES**

COURSE NO.	COURSE TITLE	CREDIT UNIT	TYPE	
SEMESTER				
NO.				
PST 309	Electro- Physics for Physiotherapy Students	3	Compulsory	1
ANT 311	Gross Anatomy of Head & Neck	3	Compulsory	1
PST 311	Introduction to Physiotherapy Profession & Clinical Practice	3	Compulsory	1
PST 312	Introduction to Kinesiology	3	Compulsory	1
PST 313	Exercise Physiology	3	Compulsory	1
SOC312	Introduction to Social Institutions	3	Required	1
ANT 314	Neuroanatomy	2	Required	1
<b>Total Credit units</b>		<b>20</b>		
PST 314	Thermotherapy	2	Compulsory	2
PST 315	Cryotherapy	2	Compulsory	2
PST 320	**Practical Electro- Therapy I	3	Compulsory	2
PST 321	Introduction to Movement	2	Compulsory	2
PST 322	Manual Therapy	2	Compulsory	2

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PST 323	Pathokinesiology	2	Compulsory	2
PST 324	***Practical Exercise and Manual Therapy I	2	Compulsory	2
PST 325	Prosthetics & Orthotics	2	Compulsory	2
PST 326	Introduction to Clinical Physiotherapy & General Nursing	2	Compulsory	2
PST 327	Introductory Pathology	2	Compulsory	2
PST 328	Vacation Clinical Posting	4	Compulsory	Vacation
(end of 300 Level vacation)				

**Total Credit Units 25**

\*\*The practical aspects of PST 314 and 315 shall be examined under PST 320.

\*\*\*The Practical aspects of PST 321, 322 & 323 shall be examined under PST 324. The externally moderated practical examinations shall be conducted at the end of 2<sup>nd</sup> Semester 300 level i.e. they require moderation by External Examiners.

**400 LEVEL (4<sup>TH</sup> YEAR) COURSES**

COURSE NO.	COURSE TITLE	CREDIT UNIT	TYPE	
SEMESTER				
NO.				
PST 410	Low Frequency Electrical Stimulating Currents	2	Compulsory	1
PST 411	Actino therapy and Ultrasonic Therapy	2	Compulsory	1
PST 412	*Practical Electrotherapy II	3	Compulsory	1
PST 413	Muscle Strengthening and Joint Mobilization Techniques	2	Compulsory	1
PST 414	Therapeutic Exercises	2	Compulsory	1
PST 415	Hydrotherapy	2	Compulsory	1
**PST 416	Practical Exercise Therapy & Manual Therapy II	3	Compulsory	1
PST 417	Clinical Measurements & Instrumentation.	2	Compulsory	1

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PST 418 Physical Diagnosis & Clinical Practice I	4	Compulsory	1 & 2
PCO 419 Pharmacological Considerations in Physiotherapy	2	Required	1
<b>Total Credit Units</b>	<b>24</b>		

\*Practical aspects of PST 410 and PST 411 shall be examined under PST 412.  
 \*\*Practical aspects of PST 412, PST 414 and PST 415 shall be examined under PST 416.  
 Practical examinations shall be externally moderated and conducted at the end of 2<sup>nd</sup> semester of 400 level.

COURSE	COURSE TITLE	CREDIT UNIT	TYPE
SEMESTER			
NO			
PST 420	Skeletal Disorders & Rehabilitation.	3	Compulsory 2
PST 421	Cardio- respiratory Disorders & Rehabilitation.	3	Compulsory 2
PST 422	Neurological Disorders & Rehabilitation. I	2	Compulsory 2
PST 423	Soft Tissues Disorders & Rehabilitation.	2	Compulsory 2
PST 424	Community Physiotherapy & Ergonomics	2	Compulsory 2
PST 425	Physiotherapy in women's Health and Nutritional Disorders.	2	Compulsory 2
PST 426	Research Methodology and Biostatistics.	2	Compulsory 2
PST 427	Joint disorders & Rehabilitation.	2	Compulsory 2
PST 428	Clinical Practice II	2	Compulsory 2

PST 429 Vacation Clinical posting	4	Compulsory
***Vacation		
<b>Total Credit Units</b>	<b>24</b>	

\*\*\* Vacation is the period between 400 & 500 levels (i.e. 400 level end of session vacation)

**500 LEVEL (5<sup>TH</sup> YEAR) COURSES**

COURSE SEMESTER NO	COURSE TITLE	CREDIT UNIT	TYPE
PST 510	Manipulative Therapy	3	Compulsory 1
PST 511	Neurological Disorders And Rehabilitation II	2	Compulsory 1
PST 512	Specialty Lectures (Anesthesia, Radiology, Psychiatry, Pathology, Occupational Therapy, Medical Social Work, Primary Health Care)	3	Compulsory 1
PST 513	Gerontology	2	Compulsory 1
PST 514	Introduction to Physiotherapy Administration.	2	Compulsory 1
PST 515	Physiotherapy in Disorders of Blood & Lymph Vessels	2	Compulsory 1

PST 516	Research Project Seminar	2	Compulsory	1
PST 517	Intensive Care Physiotherapy	3	Compulsory	1
PST 518	*Clinical Practice III	4	Compulsory	1& 2

PST 525 Research Project 6 Compulsory 2

**Total Credit Units**

**21**

**Total Credit Units 24**

\*PST 518 shall be examined by external moderation at the end of 2<sup>nd</sup> Semester of 500 Level.

COURSE NO	COURSE TITLE	CREDIT UNIT	TYPE	SEMESTER
PST 520	Skin Disorders & Rehabilitation	3		
	Compulsory	2		
PST 521	Sports Physiotherapy	3	Compulsory	
PST 522	Physiotherapy in Pain management	3	Compulsory	2
PST 523	Palliative care in Terminal illnesses	3	Compulsory	2
PST 524	Policy Issues in Health Care (Seminars).	3	Compulsory	2

## DESCRIPTION OF COURSES

### 100 LEVEL COURSES:

#### DESCRIPTION OF FIRST YEAR COURSES

#### 100 LEVEL COURSES: AS DESCRIBED ABOVE

### 200 LEVEL (2<sup>ND</sup> YEAR) COURSES

COURSE NO.	TITLE AND SHORT DESCRIPTION
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#### PHS 211 INTRODUCTORY AND GENERAL PHYSIOLOGY (2 credits)

Cell physiology, Physiochemical principles, Body fluids and Blood transport: Control systems. Introduction to ANS. Excitable and Contractile Cells.

#### MBC210 INTRODUCTORY BIOCHEMISTRY (2 Credits).

Short history and Definition of Biochemistry. Importance of Biochemistry to medicine and other scientific disciplines. The living cell. Organization and Molecular architecture. Types of cell and their characteristics. Structure and Organization of Biological Membranes. Biomolecules and the origin of life. Chemistry of Biomolecules: Carbohydrates' Classification, structure distribution and functional role of named examples. Chemical properties and reactions. Essentials fatty acids, Eicosanoids fat-soluble vitamins – Structure and functions. Peptide bonds and hierarchy of protein structure Nucleic acids. RNA and DNA. Structure/function of enzymes. Zymogens Active site and specificity of enzymes. Inhibition and Activation of enzymes. Factors affecting enzyme catalyses reaction. Allosteric enzymes. Isoenzymes. The Concepts of Avitaminoses, Hypovitaminoses and Antivitamins. Vitamins and their Co-enzyme function. Biomedical importance of vitamins.

#### ANT 210 GENERAL ANATOMY AND GROSS ANATOMY OF THE UPPER LIMB (2 Credits).

The general descriptive terms as used in the study of the human body would be introduced. The techniques used to study the human body would also be introduced. The normal anatomical position and directional movement of body parts would be introduced. The gross anatomy of the upper limbs: pectoral region, Axilla, Brachial plexus, scapular region, brachium, Antebrachial fossa and its Anastomosis, carpal

tunnel, Hand, Nerve injuries, osteology and joints of the upper limb, the vascular anastomosis and lymphatic drainage of the breast and the upper limb would be studied.

#### ANT 211 GROSS ANATOMY OF THORAX (2 Credits).

The general descriptive terms as used in the study of the human body would be introduced. The techniques used to study the human body would also be introduced. The normal anatomical position and directional movement of body parts would be introduced. The gross anatomy of the upper limbs: pectoral region, Axilla, Brachial plexus, scapular region, brachium, Antebrachial fossa and its Anastomosis, carpal tunnel, Hand, Nerve injuries, osteology and joints of the upper limb, the vascular anastomosis and lymphatic drainage of the breast and the upper limb would be studied.

#### PHS 212 BLOOD AND BODY FLUID PHYSIOLOGY (2 credits)

Introduction and definition of body fluids and body fluid compartments. Regulation of body fluid volumes. Physiology variation of body fluid volumes. Techniques for quantifying various body fluid volumes.

Blood: Function of blood and classifications of blood cells. Erythropoiesis. Haematological indices. Haemoglobin, genotype and Blood groups. Immunology and cell defence.

#### PHS 213 CARDIOVASCULAR SYSTEMS (2 credits)

Definition and functions of the cardiovascular system, Cardiac muscle. Cardiac myoelectrophysiology, cardiac cycle, Circulation of blood: cardiac cycle, Circulation of blood: cardiac output and regulation. Blood pressure. Haemodynamics and microcirculation. Pulmonary, Cerebral, Coronary, Splanchnic and muscle circulation, shock and cardiovascular changes in exercise.

#### STAT 141 BASIC STATISTICS (2 credits)

Presentations of data as graphs, diagrams frequency and cumulative distributions. Measures of location and dispersion. Correlation and regression. Simple concept of probability. Distribution and density functions. Some basic distributions e.g. Binomial. Simple random sampling. Basic inferences about the population. Mean estimation and test based on large and small sample (one sample and two sample cases). Estimation and tests of population variance.

### **ANT 212 BASIC HISTOLOGY AND CYTOLOGY**

Description: Structure and the function of the cells, general histology and basic tissues of the body. Preparation of tissues for microscopy, is a practical oriented course that is studied alongside with the theoretically based lecture.

### **ANT 213 GENERAL EMBRYOLOGY (2 Credits)**

General consideration of the male and female Reproductive organs. Gametogenesis, fertilization, implantation, cleavage, the morula, the blastocyst formation of the primitive streak, the Bi-laminar and tri-laminar germ disc. Development of tissues and organ systems of the embryo, the chorionic and amniotic cavities, foetal membranes, placental formation and functions. The molecular regulation in differentiation of tissues and organs and in the establishment and patterning of the body axis. Birth defects, chromosomal and genetic factors. Twins and twin defects, general characteristics of the embryonic environment and foetal periods.

### **ANT 223 SYSTEMIC EMBRYOLOGY (3 Credits)**

The diaphragm, the cardiovascular, respiratory and gastrointestinal systems. Development of the adrenal gland, the liver, the pancreas and the spleen. The urogenital, musculoskeletal and integumentary systems. The limbs, the molecular regulation and associated developmental anomalies of the systems.

### **MBC 220 CARBOHYDRATE AND LIPID METABOLISM (3 Credits)**

Structural inter-relationships of sugars. Stereochemistry of sugars. Hexoses, Pentoses, Disaccharides, Starch, Glycogen, and Polysaccharides. Methods of identifying sugars. Carbohydrate metabolism. Digestion and absorption. Glycolysis. TCA Cycle and Pentose Phosphate pathway. Control of Glycolysis. Glycolate Pathway. Gluconeogenesis. Glycogenolysis and Glycogenesis. Mitochondrial electron transport chain and Oxidative Phosphorylation. Energy generation and storage in Biological systems. Disorders of Carbohydrate Metabolism. The pyruvate and  $\alpha$ -Ketoglutarate complexes and their regulation. Metabolism of lipids. Digestion and absorption. Role of Lipoproteins in lipid transport. Metabolism of lipoprotein in health and disease. Triacylglycerol oxidation and oxidation of fatty acids. Storage and mobilization of energy stores in adipocytes. Ketone bodies and Ketosis. Interrelationship of fatty acid and carbohydrate biosynthesis/oxidation. Biological importance of Eicosanoids. Glycolipids and sphingolipids. The Chemistry and metabolism of Steroids and Steroid hormones.

### **PHS 214 RESPIRATORY PHYSIOLOGY (2 Credits)**

Definition and functions of the respiratory system, Physiologic anatomy of the respiratory system. Respiratory dynamics and work. Pulmonary ventilation: Lung

volumes and capacities, spirometry. Mechanism and mechanics of breathing, Lung surfactant, pulmonary circulation. Gas exchange and Gas transport. Oxygen Haemoglobin dissociation curve. Hypoxia and Dyspnoea. Respiratory changes in exercise and barometric changes. Control of breathing.

### **MBC 211 INTRODUCTORY ANALYTICAL TECHNIQUES (2 Credits)**

Measuring techniques in cell fractionation, Chromatography, Spectrophotography, Electrophoresis and Calorimetry. Methods of studying the cell. Microscopy, histochemistry and cytochemistry. Autoradiography vs. Scintillation counting. Cell fractionation methods including differential Centrifugation and Gradient centrifugation. Molecular hybridization including Paul Doty experiments. Acids, and bases. Buffers and buffer systems. Henderson Hassel bach equation. Titration curves of acids and bases. End point indicators. Zwitterions. Isoelectric pH nucleic acid.

**ANT 220** Abdomen: subdivision of the abdominal region and their applied anatomy, Anterior abdominal wall, inguinal region, posterior abdominal wall, stomach, spleen, liver, gall bladder, pancreas, small and large intestines, celiac trunk, biliary apparatus, intra and supra colic compartment and recesses, appendix, renal and suprarenal gland, dissection of the entire abdominal region for proper understanding of the entire region.

Pelvis & perineum: pelvic cavity wall and diaphragm. Pelvic visceral like the urinary bladder, uterus, testes, ovary etc. Perineum, boundaries and subdivision. Perineal pouches, external and internal genitalia, ischiorectal fossas. General dissection of the pelvis and perineum region.

### **PHS 211 DEVELOPMENTAL PSYCHOLOGY (2 credits)**

The course describes the introduction to the relationship between the functioning of social systems and behaviour and attitude of individuals. It provides an overview of the principles of psychology. The students are taught the principles of growth and development, personality and theories of personal development. They are also exposed to the techniques of counselling, group structure as well as attitudes formation and attitudinal change.

### **ANT 221 GROSS ANATOMY OF THE LOWER LIMBS (2 Credits)**

The lower limb, lumbar and lumbosacral plexus, femoral triangle, thigh, gluteal region, leg, foot, nerves injury and the applied anatomy of lower limb, popliteal fossa, Genual and ankle joints, Arch of the foot, Osteology and joints of the lower limb. Vascular Anastomosis and lymphatic drainage of the lower limb. The theoretical aspect to go alongside with the dissection of these regions in cadaver.

**MBC 223 AMINO ACID AND PROTEIN METABOLISM (3 Credits)**

Structure of amino acids. Peptide bonds. Metabolism and transport of amino acids and proteins. Digestion and absorption. Gammaglutamyl cycle. Detailed treatment of mechanism of deamination, transamination, glutamate dehydrogenase, glutamate and glutamine synthesis. The biochemical and clinical importance of these enzymes. Fate of carbon skeleton. Urea cycle. The concepts of nitrogen balance. Nitrogen turnover in cells. Degradation of amino acids. Ketogenic and glucogenic amino acids. Aromatic acid degradation and inborn errors of metabolism, metabolism of uric acid. Integration and Compartmentation in intermediary metabolism. Metabolism of one carbon compounds.

**MBC 225 PROTEIN CHEMISTRY AND ENZYMOLOGY (3 Credits)**

A review of the structural Characteristic of protein. Determination of N and C terminal amino acid. Amino acid sequence and sulphide bridges. Determination of Protein Structure by X- Crystallography. Biological functions of proteins. The oxygen transport proteins (haemoglobin and myoglobin) connective tissue protein. Collagen and elastin. Structure and function relationships.

Enzymes: Isolation and Purification from animals and plants and microorganisms. Zymogens and Isoenzymes. Characteristics of enzymes. Kinetics of enzyme catalysed reaction. Allosterism. Importance of enzymology in Medicine. Coenzyme and relationships to vitamins.

**PHS 221 RENAL PHYSIOLOGY (2 credits)**

Definition and functions of the kidney. Physiologic anatomy of the kidney. Glomerular filtration. Tubular functions. Urine formation: Dilute and concentrated Urine, Counter current mechanism, Plasma clearance, renal auto-regulation, ECF regulation, Acid Base balance, Renin-Angiotensin system.

**PHS 222 GASTROINTESTINAL PHYSIOLOGY (2 credits)**

Definition and functions, Physiologic anatomy and innervation of the GIT, Mastication, Deglutition, Salivary gland, Digestion and food absorption, Movement and Stomach

emptying, Movements of the GIT, Vomiting and defecation, GIT secretions and juices, Liver and General metabolism (BMR).

**PHS 223 ENDOCRINOLOGY AND REPRODUCTION (3 credits)**

Definition and functions, Definitions of Hormones, Methods of Measurement, Types and mechanism of Actions, Regulation, Physiologic anatomy, Hypothalamus-Hypothalamic releasing factors, Hypothalamic Nuclei, Hypothalamo-hypophyseal system, pituitary gland, tropic Hormones, GIT and other local hormones.

Structure and functions of the male and female reproductive organs, Androgens, Spermatogenesis and fertility. Infertility in male. Oogenesis, sexual cycle and hormonal regulations. Fertilization, Pregnancy, Parturition, Fertility and infertility in female. Family planning.

**PHS 224 TEMPERATURE REGULATION (1 credit)**

Body temperature and the environment, Mechanisms of heat exchange, peripheral thermoreceptors, central thermoreceptors, hyperthermia and hypothermia, Fever, heat Exhaustion and Heat stroke.

**STAT 240 GENERAL APPLIED STATISTICS (2 Credits)**

Sources of data. Collection of data. Presentation of data, grouping, table, graphs, diagrams. Ratio and rates. Analysis of data. Measures of central tendency, measures of spread correlation. Elementary probability theory and distribution. Basic ideas of statistical inference.

**CSC 110 INTRODUCTION TO COMPUTER (3 Credits)**

History of Computer, functional components of a computer, characteristics of a computer, problem solving, flowcharts, algorithm. Basic computer programming: statement, symbolic names, arrays, subscript expression and control statements. Introduction to visual basic programming, computer applications.

### 300 LEVEL (3<sup>RD</sup> YEAR) COURSES

#### COURSE NO. TITLE AND SHORT DESCRIPTION

##### **PST 310 ELECTROPHYSICS FOR PHYSIOTHERAPY STUDENTS (3 credits)**

Electricity: Current electricity, thermal and chemical effects of currents, alternating currents, series circuits, capacitors, inductors and transformers.

Modern Physics: Structure of the atom, energy levels and radiation, electromagnetic spectrum application to medicine.

Nuclear radiation and application to medicine. Electronics: Rectifiers and simple amplifiers. Sound waves: Nature of sound waves. Ultrasound and its application to medicine.

##### **ANT 311 GROSS ANATOMY OF THE HEAD AND NECK (3 CREDITS)**

Skull, scalp and the face. Side of the neck, cervical fascia, posterior and anterior triangle of the neck, back of the Neck, cranial cavities, temporal and infratemporal regions, parotid region and submandibular region, deep structures of the neck, thyroid and parathyroid glands, oral cavity, pharynx and larynx, nasal cavity, Ear and orbit (eye).

##### **ANT 314 NEUROANATOMY I (2 Credits)**

Coverings of the brain and spinal cord. Forebrain, midbrain and hindbrain. Ventricular systems, production and flow of cerebrospinal fluid (CSF), Ascending and descending tracts in the brain and spinal cord, External and internal structures of brain and spinal cord, structures and pathways in the brainstem and spinal cord.

##### **PST 311 INTRODUCTION TO PHYSIOTHERAPY PROFESSION (3 Credits)**

The philosophy and underlying principles on which physiotherapy practices are based. History, ethical orientation and scope of practice. Roles of Physiotherapy in preventive, promotive, curative and rehabilitative care.

##### **PST 312 INTRODUCTION TO KINESIOLOGY (3 Credits)**

A study of bio-mechanical principles as related to human motion. Relationship of anatomic structure to function. Muscular analysis of common movements in sports, gymnastics and daily activities. Principles of motion and force as they apply to the body in action and in equilibrium.

##### **PST 313 EXERCISE PHYSIOLOGY (3 Credits)**

Physiological adjustments of major body systems to various types of exercise in health and disease. Muscle structure and function. Energy systems and body fuels. Final common pathway of metabolism. Body response to acute exercise and adaptations to chronic exercise. Effects of exercise on body composition.

##### **SOC 202 INTRODUCTION TO SOCIAL INSTITUTIONS (3 Credits)**

Comparative study of human societies and cultures. Particular emphasis on institutional arrangements such as economy, politics, family, religion, education, art, health systems. Attention will be paid to socio-cultural change processes as well as the rise of radical perspectives relevant to our contemporary situation.

##### **PST 314 THERMOTHERAPY (2 Credits)**

Physical principles and procedures governing the use of heating modalities in physiotherapy. Production, physiological effects, indications, therapeutic uses and contraindications. Dangers and precautionary safety measures for each of the various heat producing modalities.

##### **PST 315 CRYOTHERAPY (2 Credits)**

Historical development. Principles of chemical preparations for cold therapy and endothermic reactions. Physiological effects, therapeutic uses, indication and contraindications. Methods and techniques of application. Dangers and safety measures.

##### **PST 320 PRACTICAL ELECTROTHERAPY 1 (3 credits)**

This is to test practical aspect of PST 320 and PST 321.

##### **PST 321 INTRODUCTION TO MOVEMENT (2 Credits)**

Classification of movement. Fundamental and derived starting positions. Relaxed and forced passive movements. Free and resisted active movements. Types of resistance used for treatment.

##### **PST 322 MANUAL THERAPY (2 Credits)**

History and developments in definitions of manual therapy. Preparation for massage. Classification of manipulations and individual techniques. Techniques for various body regions and specific cases like scars, ulcers etc. Bandaging: types and techniques.

##### **PST 323 PATHOKINESIOLOGY (2 Credits)**

Principles, classifications and applications of motor skills. Identification and analysis of normal and abnormal human postures and movements. Corrective therapy for abnormal human motions and postures.

##### **PST 324 PRACTICAL EXERCISE THERAPY 1 (2 Credits)**

This is to test the practical aspect of PST 323, PST 324 and PST 325

##### **PST 325 ORTHOTICS AND PROSTHETICS (2 Credits)**

An appraisal of the different assistive devices: techniques, methods of fabrication and application of these devices. Different types of Orthotics and prosthetic devices for correcting or assisting specific problems. Biomechanical principles in giving prosthesis and Orthotics and the criteria for selection. Physiotherapy in the rehabilitation of the amputee. Patient' education on

care, maintenance and uses of orthosis and prosthesis. Dangers, complications and contraindications in use of the different assistance/corrective devices. Care, uses and prescription of wheelchairs and other assistive devices for activities of daily living e.g. crutches, walking frames and sticks.

**PST 326 INTRODUCTION TO CLINICALS INCLUDING GENERAL NURSING (2 Credits)**

- a. Introduction to clinicals – importance of patients in health care, and patient's family in treatment. Responsibilities of the clinician and the patient. Student/patient relationship. Respect and confidentiality.
- b. Patient care communication – Professional conduct and ethical practice. Teamwork. Listening and interviewing skills. Use and interpretation of verbal and non verbal communication. Emotional responses to, and strategies for managing patient's behaviour, patient's safety and comfort
- c. Fundamental procedures in physiotherapy – muscles assessment. Functional assessment. Joint evaluation.
- d. General Nursing – Total care of the patient. Fundamental procedures in physiotherapy and general nursing. Bed making patient lifting, observation of vital signs, skin care and bed sore prevention, wound dressing, first aid, use of suction machine and intensive care of patients

**PST 327 INTRODUCTORY PATHOLOGY (2 Credits)**

Pathology of diseases. Cellular basis of diseases. Inflammation and healing, Immune mechanisms, physical agents in injury and disease, Drug and chemical injury, radiation injury, Atrophy, Hypertrophy, Degeneration, Oedema, Thrombosis, Infarction, Bacterial and Viral diseases, fungal infections, Tumours and inherited diseases.

**PST 328 VACATION CLINICAL POSTING (4 Credits)**

Patient's assessment, treatment plan and programme. Relating theory to practice in patient handling, effective communication, professional attitude and responsibility.

**400 LEVEL (4<sup>TH</sup> YEAR) COURSES**

**TITLE AND SHORT DESCRIPTION**

**PST 410 LOW FREQUENCY ELECTRICAL STIMULATING CURRENTS (2 Credits)**

Physical principles and procedures governing the use of low frequency electrical stimulating currents. Use, production, physical/physiological effects, therapeutic uses, indications contraindications for, dangers of and precautionary measures to be taken in each type of low-frequency current. Positioning and operation of the different types of machine. Treatment record. Merits of each type of current. Electro-diagnosis. Electro-analgesia. Current innovations in electrotherapy.

**PST 411**

**ACTINOTHERAPY AND ULTRASONIC THERAPY (2 Credits)**

Physical principles and procedures governing the use of ultrasound and ultraviolet rays. Production and use. Physiological effects and therapeutic uses. Indications and contraindications for, dangers of and precautionary safety measures. Positioning and operation of machines. Treatment record. Merits of each modality.

**PST 412 PRACTICAL ELECTROTHERAPY II (3 Credits)**

This is to test the practical aspect of PST 410 and PST 411.

**PST 413 MUSCLE STRENGTHENING AND JOINT MOBILIZATION (2 Credits)**

Principles of muscle strengthening in health and disease as applied to major muscles of the body. Modalities for strengthening muscles and basis for choice. Role of motor unit in muscle strengthening. Clinical measurement, evaluation and instrumentation in strength development. Indications for strength development in health and disease. Techniques for strengthening major muscles in the body. Techniques of mobilizing various joints of the body after loss of full Range of Motion (ROM). Normal ROM and evaluation. Causes of loss of full R.O.M. and indications for mobilization of mobilization of joints. Modalities for joint mobilization and basis for choice. Mobilization techniques for all major joints.

**PST 414 THERAPEUTIC EXERCISES (2 Credits)**

Exercise for the treatment of specific types of disease conditions. Group therapy, suspension therapy, traction, breathing exercises, relaxation techniques, facilitated movement, and neuro-muscular coordination exercises, health promotion, principles of exercise prescription. Lower motor neuron lesions, amputees, arthritis, back pain, pulmonary diseases, hemiplegia and paraplegia.

**PST 415 HYDROTHERAPY (2 Credits)**

Historical background. Origin, types and characteristics of spas, facilities in modern spa, indications and contraindications of hydrotherapy. Special skills for hydrotherapy. General and special properties of water, such as surface tension, floatation, direction of flow of water currents, temperature of water etc. Hydrotherapy pools, safety of patients and physiotherapist, temperature of treatment pools, humidity, ventilation, hydrometer. Baths, types and classifications, effects and mode of application. Function of skin in relation to baths. Treatment in pools, whirl pools for hydrotherapy- effects and uses. Techniques in treating conditions- poliomyelitis, spasticity, rheumatoid and orthopaedic conditions. Types of pool, care and maintenance. Exercises in and out of water. Water diseases; prevention and treatment.

**PST 416 PRACTICAL EXERCISE THERAPY (3 Credits)**

This is to test the practical aspect of PST 413, PST 414 and PST 415

**PST 417 CLINICAL MEASUREMENTS AND INSTRUMENTATION (2 Credits)**

Measurements, measuring instruments and evaluation. Selecting and development of, measuring instruments. Concepts of validity, reliability and administration. Measurement of discrete variables- pain, muscle strength (static, isotonic, isokinetic), range of motion, anthropometric measurements, cardio respiratory fitness measurements (stress test), lung function tests, motor function tests. Etc

**PST 418 PHYSICAL DIAGNOSIS AND CLINICAL PRACTICE I (4 Credits)**

Techniques of physical diagnosis and physical findings in common diseases. General principles, physical examination, vital signs. Clinical assessment of the respiratory, cardiovascular, musculoskeletal and neurological systems.

**PCO 419 PHARMACOLOGICAL CONSIDERATIONS IN PHYSIOTHERAPY (2 Credits)**

Introduction to Pharmacology. Routes of drug administration. Basic principles of pharmacokinetics. Absorption, distribution and biotransformation of drugs. Drug reception interactions. Non-Steroidal Anti Inflammatory Drugs (NSAID). Muscle relaxants, sedatives and analgesic agents. Anti-hypertensive drugs. Bronchodilators etc.

**PST 420 SKELETAL INJURIES AND DISORDERS AND REHABILITATION (2 Credits)**

Principles and physical management of skeletal disorders. Epidemiology, pathology and clinical features of skeletal disorders. Assessment procedures and physical treatment of patients. Principles of physiotherapy in the total management of fracture. Management, definition, classification, complications, conservative and surgical management of fractures. Bone infection. Disorders of osteoid formation and maintenance. Disorder of bone mineralization.

**PST 421 CARDIORESPIRATORY DISORDER AND REHABILITATION (2 Credits)**

Basic physiological principles involved in respiration and the dynamics of circulation. Relation of pathophysiology to methods of physiotherapy management. Specific Respiratory and cardiovascular disorders. Principles of cardiac rehabilitation and cardiac massage.

**PST 422 NEUROLOGICAL DISORDERS AND REHABILITATION 1 (2 Credits)**

Review of the physiology of central and peripheral nervous system. Proprioceptive neuromuscular facilitation. Maturational reflexes and reactions. Components of motor development. Principles of neurological assessment. Sensory and motor dysfunctions. Lesions within the skull resulting in hemiplegia, Parkinson's disease, cerebral palsy, head injuries and tumours. Lesions within the spinal column –could result in paraplegia, quadriplegia, tabes dorsalis, disseminated sclerosis, polyneuritis, peripheral neuropathy, syringomyelia, spinal bifida, poliomyelitis, myasthenia gravis, meningocele etc. Medical, surgical and physiotherapy management of conditions.

**PST 423 SOFT TISSUE DISORDERS AND REHABILITATION (2 Credits)**

Principles of physical management of disorders of skeletal muscle and adjoining soft tissue. Infection of skeletal muscles Muscular dystrophies – Progressive, muscular, myotonic, fascia, scapulohumeral, distal muscular and ocular myodystrophy: Anyotomia and myotonia congenital; abnormalities of the foot and hand. Myasthenia gravis. Management of chronic and acute soft tissue injuries (muscular, tendinous and ligamentous injuries, tendinitis etc.) Acquired and congenital abnormalities of the foot and hand.

**PST 424 COMMUNITY PHYSIOTHERAPY AND ERGONOMICS (2 Credits)**

Definition of work environment: Appraisal; of vocation: Adaptations of machines and general conditions; normal/apparently healthy individual: physical/mentally handicapped individual: Human characteristics and work task. Open and closed systems. Accidents and safety in industry, the home and transportation; existing legislation; causes of accidents and prevention: heat stress and heat stroke. Assessment of physical, psychosocial and chemical abuses in industries. Health Education, Community clinic and itinerant and domiciliary physiotherapy services. Philosophies of primary health care (PHC)

**PST 425 PHYSIOTHERAPY IN WOMEN'S HEALTH AND NUTRITIONAL DISORDERS (2 Credits)**

A. Obstetrics – The structure, function and injuries of the pelvic floor. Physiological and metabolic changes in pregnancy and complications. Pre and post natal physiotherapy. Parturition. Caesarian section. Weak abdominal and pelvic floor muscles.

- B. Gynaecological – Pelvic inflammatory diseases. Incontinence. Vesicovagina fistula, pelvic floor repair. Retroverted and prolapsed uterus. Menopausal changes.
- C. Nutritional Disorders – Nutritional factors in diseases. Aetiology of nutritional disorders, quantitative and qualitative aspects of nutrition. Protein-caloric malnutrition – Kwashiorkor, nutritional marasmus. Vitamins and disorders due to vitamin deficiency-rickets, osteomalacia, osteoporosis. Nutritional neurological syndromes- nutritional and alcoholic polyneuropathies. Obesity, prevention of nutritional disorder.

**PST 426 RESEARCH METHODOLOGY AND BIOSTATISTICS (2 Credits)**

Research in physiotherapy, research problems, literature review, research design/protocol, data collection and storage, referencing, simple statistics in research. Central role of statistics in medicine, variables, routines and special data collection sampling, reduction, Summarization and presentation of data. Probability, normal distribution, sampling methods, tests of hypothesis. Measurement of health.

**PST 427 JOINT DISORDERS AND REHABILITATION (2 Credits)**

Degenerative joint disorders - Osteoarthritis, Cervical and lumbar spondylosis, intervertebral disc lesion; low back pain syndrome. Infectious Joint Disorders- septic arthritis, tuberculous arthritis. Polyarthritis of unknown cause- Rheumatoid arthritis, Juvenile rheumatoid arthritis, ankylosing spondylitis. Crystal arthritis/gout.

**PST 428 CLINICAL PRACTICE II (2 Credits)**

Application of the knowledge of physiotherapy assessment skills and physiotherapy modalities on patients for preventive, alleviating and health promotion purposes under the supervision of experienced physiotherapists.

**PST 429 STUDENTS INDUSTRIAL WORK EXPERIENCE SCHEME (VACATION CLINICAL AFFILIATION PROGRAMME) (4 Credits)**

This is to expose students to physiotherapy practice outside their hitherto ideal Teaching Hospital, set up.

Rotation through the following areas during the long vacation to promote entrepreneurship skills:

- a) community physiotherapy and ergonomics, b)sports medicine,
- c)private physiotherapy practice,
- d)rehabilitation homes,
- e) psychiatric hospitals,
- f) leprosarium,
- g) industrial health clinics,
- h) general hospitals,
- i)orthopaedic hospitals etc

**500 LEVEL (5<sup>TH</sup> YEAR) COURSES**

COURSE NO DESCRIPTION	TITLE AND	SHORT
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**PST 510 MANIPULATIVE THERAPY (3 Credits)**

Passive and forced means of joint manipulation. Manual traction with relaxed passive movement. Prolonged stretching of tissues to correct deformity. Introduction to the manipulative techniques of the various schools of thought e.g. Maitland, Nwuga, McKenzie etc.

**PST 511 NEUROLOGICAL DISORDERS AND REHABILITATION II (2 Credits)**

Pre-requisite:- PST 412 Neurological disorders and rehabilitation I

**PST 512 SPECIALTY LECTURES (ANAESTHESIA, RADIOLOGY, PSYCHIATRY, PATHOLOGY, OCCUPATIONAL THERAPY, MEDICAL SOCIAL WORK AND PRAIMARYU HEALTH CARE) (3 Credits)**

Surgery – Observation of operating theatre procedures in the general, neuro and plastic surgery units. Clinical psychology – Personality development and assessment, learning and clinical Applications, human motivations and emotions, Memory and forgetting, Attitude and behaviour. Medical Social Sciences - Services rendered and funding, psychiatric and paediatric social work, problems involved in medical social practice. Paediatrics – Neonatal tetanus, cerebral malaria, kernicterus, burns, T.B., meningitis, post measles encephalitis, poliomyelitis, cerebral palsy. Metabolic and deficiency diseases – diabetes, rickets, beriberi, kwashiorkor, radiology –recognition of fractures, dislocations, degenerative changes in the joints including the vertebrae, recognition of chest conditions- pre and post operation, X-ray in medical and surgical care. Pathology- degeneration, inflammation, healing and repair processes of soft tissue, bone and specialized tissues, disturbances of growth ( Hypertrophy, hyperplasia, metaplasia, atrophy etc), disturbances of circulation )Thrombosis, embolism, infarction), pigment disturbances, neoplasm.

Psychiatry- psychological disorders, neurosis including schizophrenia, personality disorders, epilepsy, organic brain syndromes, mental retardation, behaviour disorders of childhood and adolescence. Anaesthesia- Use of stethoscope, general principles of respiratory care, endotracheal and tracheotomy tubes, use and care of suction apparatus, use and care of drainage tubes and drips, management of the unconscious patient, syncope and electrical shock resuscitation, cardiac arrest and external cardiac massage, artificial respiratory complication.

**PST 513 GERONTOLOGY (2 Credits)**

Methods of evaluation and management of geriatric disorders, diabetes mellitus, cardiovascular disorders, musculoskeletal disorders and debilitating conditions. Home care and institutional care. Multidisciplinary approach to gerontology.

**PST 514 INTRODUCTION PHYSIOTHERAPY ADMINISTRATION AND MANAGEMENT (2 Credits)**

Elements of managerial process. Analysis of problems involving the planning, developing, organizing and administering physiotherapy services. Physiotherapy department, organization and management, principles of management, human relations, management techniques, personnel management, communications, financial management, legal responsibilities.

**PST 515 PHYSIOTHERAPY IN DISORDERS OF BLOOD AND LYMPH VESSELS (2 Credits)**

Atherosclerosis, arteriosclerosis, aneurism, Buerger's-Raynaud's disease, phlebitis, thrombosis, embolism, varicose veins, sickle cell diseases.

**PST 516 RESEARCH PROJECT SEMINAR (2 Credits)**

Each student writes a research proposal under the supervision of a lecturer and presents this as a departmental seminar. The student is graded for the quality of the seminar, his ability to respond intelligently to questions raised, and his attendance and participation when his colleagues present seminars.

**PST 517 INTENSIVE CARE PHYSIOTHERAPY (3 Credits)**

General principles of intensive care. Types of incision, anaesthesia and the respiratory, circulatory and musculoskeletal complications due to anaesthesia. Intensive care of the burnt patients. Care of the unconscious patient and the critically ill patient.

**PST 518 CLINICAL PRACTICE III (4 Credits)**

Same as CLINICAL PRACTICE II but with greater responsibilities in patient care.

**PST 520 SKIN DISORDERS AND REHABILITATION (3 Credits)**

The use of physiotherapy modalities in the management of skin disorders such as; pressure points and pressure ulcers, varicose ulcers, decubitous ulcers, buruli ulcers, acne vulgaris, psoriasis, vitiligo, alopecia areata and totalis, eczema, burns, skin disorders in leprosy and diabetes mellitus etc.

**PST 521 SPORTS PHYSIOTHERAPY (3 Credits)**

The role of physiotherapy in sports. Relationship with sportsmen, coaches, trainers, sports psychologists, sports medical team etc. Prevention and treatment of sports injuries. Health promotion for sportsmen through the attainment and maintenance of adequate physical fitness levels. Assessment of physical fitness status of sportsmen i.e., cardio-pulmonary and musculo-skeletal fitness. Ethics of sports physiotherapy practice. Good working knowledge of the rules of each sport, intrinsic and extrinsic causes of sports injuries for each sport. Good clinical judgment to carry out prompt and effective assessment of the severity of sports injuries as well as give prompt, appropriate and effective treatment.

**PST 522 PHYSIOTHERAPY IN PAIN MANAGEMENT (3 Credits)**

Assessment and management of pain as a clinical entity. Pain is considered in all its ramifications; physical, pathological, emotional, social, psychological, financial, spiritual etc. The role of the physiotherapist in the holistic assessment and management of pain in all its presenting ramifications as a member of the pain clinic.

**PST523 PALLIATIVE CARE IN TERMINAL ILLNESSES (3 Credits)**

Philosophical issues in palliative care. Psycho-social issues. Introduction to pain control; pain syndromes in cancer and HIV/ AIDS. Pharmacological management of cancer pain. Other symptoms and their control with emphasis on the GIT, psycho-neurological and urinary symptoms. Roles of Radiotherapy, Chemotherapy, Surgery and physiotherapy in palliation. Communication skills with patient and relatives, spiritual and psychological supports dying and death, bereavement.

**PST 524 POLICY ISSUES IN HEALTH CARE (SEMINARS) (3 Credits)**

Seminars on topical issues such as the International Health definitions and classifications; ICF (formally ICIDH). Determinants of health, disease prevention and health promotion. The Nigerian health environment, policies and statistics. Concept of "Evidence Based" decision making and practice. Health care focus on selected population (women, children and the elderly). Ethical issues in general clinical practice with emphasis on ethical issues in physiotherapy practice. Public and private funding of health care services. The National Health Insurance Scheme. Entrepreneurship in health care. HIV/AIDS. Cancers etc.

**PST525 RESEARCH PROJECT (6 Credits)**

The student undertakes and reports his independent research findings as a dissertation which is submitted to the Department of Physiotherapy in partial fulfilment for the award of Bachelor of Physiotherapy degree of the University. The dissertation is examined in its written form and a Viva Voce.

**DEPARTMENT OF RADIOGRAPHY  
SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL  
SCIENCES  
BACHELOR OF SCIENCE (BSc) RADIOGRAPHY PROGRAMME**

**ACADEMIC STAFF**

S/NO	NAMES	QUALIFICATION	POSITION
1.	ADAMS Osikome Hilda	BSc; MSc	Assistant Lecturer
2.	EZE Ejiro.	BSc; MSc	Assistant Lecturer

**GENERAL INFORMATION.**

**Preamble**

The University of Benin is a first generation University that has enormous number of undergraduate training programmes in the health sector. However, medical science is a rapidly growing field with an ever increasing number of training programmes. Also, the University Of Benin has frequently kept pace by relentlessly increasing her number of the medically related undergraduate training programmes to meet with the health care needs.

**Justification for Radiography Training Programme Review**

The management of the sick involves history taking, examination, diagnosis and treatment. Radiography/radio science is particularly important in the diagnosis and treatment of illnesses in the areas of oncology and orthopedics. These two areas are constantly saddled with patients hence the need for training man power in the field of radiography. Furthermore, no University the South-South geopolitical zone is presently offering the course.

The demand for radiography and radiosience is on the increase because of advances in medical imaging technology.

**Mission & Vision of the University**

The mission statement of the University of Benin is to develop the human mind, to be creative, innovative, research oriented, competent in areas of specialization, knowledgeable in entrepreneurship and dedicated to service.

**Philosophy, Aims and Objectives of the Degree Programme**

**Philosophy**

Radiological Sciences has experienced rapid and tremendous changes in the recent past due to technological advances in medical imaging and associated role development. Consequently, the body of knowledge necessary to cope with these advances and abilities, expertise, skills and responsibilities have similarly expanded. Radiography education must thus address these issues in frame work and be poised for a continuous review as the need arises.

**Aims and Objectives**

The programme is designed to fulfill the following objectives:

To prepare students with sufficient theoretical scientific knowledge base and practical skills that enable them assume professional positions as radiographers/medical imaging scientist who can use the most complex medical imaging equipment and procedures.

To develop in students the relevant practical and technological competence in radiography practice at primary, secondary and tertiary levels of healthcare. To assist students in the development of interpersonal skills necessary to function as members of the health team.

To develop in students a high level of proficiency in conventional radiography and a Good working knowledge of other imaging modalities (viz medical ultrasound, C.T., MRI) and radiotherapeutic procedures.

To prepare students with sufficient knowledge and analytical skills that equip them for further studies, research development/modification of medical imaging techniques for the diagnosis and treatment of diseases.

To generate in students an appreciation of the role of radiography in healthcare delivery, environmental and social relevance, e.g. photography, bioinformatics and information technology.

To develop in students the spirit of entrepreneurship so that on graduation, they can cope with self employment.

**Admission and Graduation Requirements**

**UTME:** In addition to the general admission requirements, candidates with Diploma Certificate in Radiography with five credits at "0" Level or Senior Secondary School Certificate (SSCE) can be considered for direct entry. The programme will be a five-year course leading to the award of a Bachelor of Science (B.Sc.) Radiography and Radiation. The Radiography and Radiation Science programme will be located with the Faculty of Medicine or Health Science.

**Direct Entry**

(i) Candidate for direct entry, in addition to the above ordinary level credits, must have passes in Chemistry, Physics and one other Sciences subject at the Advanced Level of General Certificate of Education (GCE 'A' Level) or its equivalent.

(ii) Graduates with a minimum of second class lower division in the Sciences from recognized universities can be admitted.

## Learning Outcome

### a) Regime and Subject Knowledge

It is expected that all programme will ensure that students become conversant with the following main aspect of medical radiography and other imaging modalities: Fundamentals, terminologies, nomenclature, basic concepts and units in physics up to first year level in the university (A' Level equivalent) including elements of modern physics and practicals viz: General Biology and principles of chemistry up to first year level including relevant practicals.

Good acquisition of both written and oral communication skills in English Language sufficient to ensure effective and functional communication required.

Mathematical methods - up to 100 level mathematics course

Elements of humanities that ensure well rounded education

Basic medical sciences including Gross Anatomy, Physiology, Biochemistry and relevant practical courses.

Simple nursing procedures and patient observation.

Hospital practice principles and care of patients. Medicolegal issues

Psychology in ill-health and applications in patient care

Radiation Physics, Bioeffects, Protection and its management

### Graduation Requirement

- In addition to the course unit examination, students shall be required to undergo a comprehensive examination. The final comprehensive evaluation shall be a university examination with the participation of external examiners and the Radiographers Registration Board of Nigeria. It shall consist of written papers research project defence as well as oral or viva voice.
- The pass mark for core Radiography courses is 50%. This is a professional requirement. > To qualify for the award of a degree of B.Sc Radiography, the student must also satisfy the professional requirement in the 1000 Radio diagnostic Examinations. Log books are issued to the students for this.
- The third year second semester clinical posting viva and the final B.Sc examination is professionally moderated by the Radiographers Registration Board of Nigeria. It consist of courses RAD 341 and Viva Voice.
- Upon graduation, students are expected to undergo a One year mandatory internship programme in an approved hospital before undertaking the National Youth Service Corps posting. This is a professional requirement. To graduate, students must pass all courses including the GSS courses.
- In the final year, no student will be allowed to take the final degree examination unless they have satisfied all professional requirements in the clinical aspect of the course. > The third year students must register with the Radiographers Registration Board of Nigeria at the beginning of the semester.

## DEGREE CLASSIFICATION AND GRADING SYSTEM

Examination grades will be reported with the following designation:

PERCENTAGE MARK	LETTER GRADE	GRADE POINT	REMARK
70- 100	A	5.00	EXCELLENT
60- 69	B	4.00	VERY GOOD
50- 59	C	3.00	GOOD
0-49	D	1.00	FAIL

### DESCRIPTION OF FIRST YEAR COURSES

#### 100 LEVEL COURSES

##### PPB 111 DIVERSITY OF PLANTS (3 CREDITS)

Morphology and life cycle of plants and animals. A general study of plant and animal groups from virus, algae/fungi to caudates. Structural and functional study of plant and animal cells, tissues, organs and systems. Taxonomic, physiological and developmental studies of plants and animals. Reproduction, genetics, hereditary substances, mechanism of nuclear division and stem cell formation. Evolution and natural selection. Biology practicals and demonstration.

##### AEB 111 INTRODUCTION TO ANIMAL ANDD ENVIRONMENTAL BIOLOGY (4 CREDITS)

Man population growth and impact on the biosphere. Faunal biodiversity. Invertebrate – protozoa, coelenterates, platyhelminthes, annelida, mollusca, arthropoda. Vertebrata – Cephalocaudata, pisces, amphibians, reptilia, aves, mammalia. Mammalian anatomy: Anatomy of rattus rattus.

PHY 111 MECHANICS, THERMAL PHYSICS AND PROPERTIES OF MATTER (3 CREDITS)

Dimensional analysis. Element of statistics. Vector algebra, kinematics and dynamics of a mass point. Elementary mechanics and gravitation. Kepler's laws. Motion of rigid bodies, moment of inertia, angular momentum. Conservation Laws. Simple Harmonic Motion. Elastic Properties of Solids. Module of Elasticity. Fluid dynamics and hydrodynamics. Laws of thermodynamics and thermal energy, temperature, calorimetry, change of state, critical points. Heat transfer, conduction, convection and radiation. Black body radiation. Gas laws. Kinetic theory of gases. Physics practicals and demonstrations.

PHY113 VIBRATIONS, WAVES AND OPTICS (3 CREDITS)

Electrostatics, cykinv's law, Gauss' law and simple application. Electric field energy and electrostatic potentials. Capacitance, conductors, insulators, dielectrics and polarisation. Electric current. Ohm's law. Circuit analysis. Thermoelectricity. Magnetic effect of currents. Ampere's law application. Magnetism. Earth's magnetic field. Faraday's law of induction. Alternating current. AC circuit – Measuring devices. Hall's effect. Optics-basic principle and applications. Eye, lenses and glasses as applied to common eye defects. Physics practical and demonstration.

CHM 111 GENERAL CHEMISTRY I (3 CREDITS)

An introduction to atomic structure and electronic configuration of the elements. Electronic theory of valency. The periodic classification and general study of the elements with emphasis on similarities and differences based on position in the periodic table. Radioactivity and its application. Kinetic theory and laws of gases. Properties of dilute solutions. Thermo-chemistry. Chemical equilibrium. Theory of acids, bases and indicators. Phase equilibrium study and multicomponent systems and application in partition and absorption chromatography. Chemistry practical and demonstration.

CHM 113 ORGANIC CHEMISTRY I (3 CREDITS)

Introduction to organic chemistry. IUPAC nomenclature, elemental analysis and molecular formulae. Structural isomerism. Isolation and purification methods. The

concept of functional growth, resonance and aromaticity. A study of saturated and unsaturated hydrocarbons. Cyclic hydrocarbons, alcohols, alkyl halides, others, aldehydes, comparison of phenols, alkyl halides and aromatic amines with their aliphatic analogues. Common synthetic polymers and their uses. Introduction to carbohydrates, proteins, oils and fats. Optical isomerism. Chemistry practicals and demonstration.

BMS 111 ELEMENTARY MATHEMATICS (2 CREDITS)

Polynomials and their factorisation, rational function. Trigonometry definitions and elementary properties of trigonometric function, radian measure, periodicity of identities. Formulas for sum, product and quotient. The chain rule. Differentiation of definite and indefinite algebraic, trigonometric, exponential and logarithmic functions maxims and minima, tangential and normal. Fundamental theory of calculus. Simple applications to areas and volumes, methods of integration.

GST 111 USE OF ENGLISH I (2 CREDITS)

Modes and methods of effective communication in English. Use of literary words to improve communication skills. Development of reading and writing skills. Note taking and summarizing from oral English and written instructions on lexis. Collection for written assignments.

GST 112 PHILOSOPHY AND LOGIC (2 CREDITS)

Introduction to the main branches of philosophy symbolic logic. Special symbols in symbolic logic. Conjugation, negation, affirmation, disjunction, equivalence and conditional statements. Law of thought. Methods of deduction using rules of inference and biconditional qualification theory.

CHM 122 GENERAL CHEMISTRY II (3 CREDITS)

Acids, bases and salts. Quantitative and qualitative analysis. Theory of volumetric analysis – operations and methods. Calculations: mole, molarity, molality. Behaviour of electrolytes. Water. Colligative properties. Ostwald's dilution law; Arrhenius theory; Bronsted-Lowry; Lewis concepts and applications. Buffers – introduction to reaction rates. Equilibria and equilibrium constant. Solubility products. Common effects. Precipitation reactions, chemistry of redox reactions.

CHM 124 ORGANIC CHEMISTRY II (3 CREDITS)

Polar function group chemistry. Hydroxyl group, carbonyl group, carboxylic group, carboxylic acid derivatives and amino acids. Miscellaneous topics – fats and oils, amino acids, proteins, carbohydrates and natural products.

PHY 109 PRACTICAL PHYSICS (2 CREDITS)

Students are expected to carry out a minimum of 12 major experiments covering the main aspects of the course taken in the year.

PHY 124 ELECTROMAGNETIC AND MODERN PHYSICS (4 CREDITS)

Electromagnetism – electric field, steady direct current, Kirschoff's laws, capacitors, electromagnetic fields, alternating current, magnetic fields, electromagnetic inductions and electricity and matter. Modern physics – structure of the atom and structure of the nucleus.

PPB 122 PLANT FORM AND FUNCTIONS (3 CREDITS)

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

AEB 122 FUNCTIONAL ZOOLOGY (4 CREDITS)

Embryology – gametogenesis, fertilisation and cleavage as demonstrated by amphioxus genetics: the cell and distribution of genetic material, mitosis, meiosis, meiosis inheritance, sex determination and sex-linked inheritance. Histology. Cells, tissues, organ formation and main features. Physiology: functioning of mammalian skin, muscles/skeleton, alimentary system/nutritional requirements and deficiencies.

GST 121 USE OF ENGLISH II (2 CREDITS)

GST 122 NIGERIA PEOPLE AND CULTURE (2 CREDITS)

History, norms and cultural characteristics of African and the Nigerian society in particular, role of culture in the behaviour of Nigerians. The African society,

development, migration, large and small rural migration and its effect on man and disease. The Nigerian rural and urban societies and diseases. Changing patterns of diseases in rural and urban societies. Changing moral values. Cultural nationalism and political evolution of African states. Concepts of religion in humanistic functions. Role and concepts of functional education in national development.

GST 123 HISTORY AND PHILOSOPHY OF SCIENCE (2 CREDITS)

GENERAL INFORMATION

The science of anatomy is the study of the form and structures of the living body and the organs which form it. It also entails the regulation of these structures in relation to their functions and external environment. The science of human anatomy forms the foundation of the science of medicine and other human biological studies. It is a field of study which is still dependent on technique and a corpus of observation but it is capable of correlation with other fields of study in the science of medicine and human biology.

ANT 201 GROSS ANATOMY I (4 CREDITS)

Upper limbs; pectoral region and mammary gland; axial and brachial plexuses, Back: deltoid and scapular region, upper arms, forearm, hand bones and joints.

Lower limbs: Front and medial thigh, Gluteal region, back of the thigh and popliteal fossa, leg, sole of foot, bones and joints, regional anatomy, surface anatomy, Applied and Radiological anatomy of upper limb and lower limb.

ANT 202 GROSS ANATOMY II (4 CREDITS)

Thorax and abdomen, thoracic wall, pleura, lungs, mediastinum and diaphragm. Anterior abdominal wall and hernia, external genitalia, peritoneum, stomach and intestine, blood supply, gut, liver, pancreas, spleen, kidneys and suprarenals.

Pelvis- Male and female perineum- pelvic wall and floor, pelvic peritoneum, viscera, nerves and vessels. Regional anatomy, surface anatomy, radiological anatomy.

ANT 301 GROSS ANATOMY III (2 CREDITS)

Head and neck: face and scalp, back and spinal cord, cranial cavity, orbits – parotid, temporal and infratemporal regions, triangles of neck, submandibular region, nerves and vessels in deep dissection of neck, thyroid and parathyroid, prevertebral region and joints of neck, mouth and tongue, pharynx and palatonasal cavity and sinuses, larynx, ear and eye.

Neuroanatomy: Meninges, base of brain and blood supply, hindbrain, medulla, pons, cerebellum and 4th ventricle, mid-brain, diencephalon and 3rd ventricle. Cerebral hemisphere, sulci and gyri, internal structures of cerebrum and lateral ventricle, basal gangli. Thalamus and hypothalamus, synapses and reflex arcs – sensory and ascending pathways, motor and descending pathways. Cerebellar connections – pathways for hearing, smell and vision. Autonomic nervous system. Radiological and applied anatomy of the above.

ANT 205 GENETICS (1 CREDIT)

Includes fundamental human genetic principles, variation in gene expression in man. Patterns of inheritance in families (autosomal dominance, autosomal recessive, X-linked dominance, X-linked recessive, Y-linked and sex influenced).

Cytogenetics, types of classification of human chromosomes, methods of preparation of human chromosomes and karyotyping, types of numerical and structural chromosome aberrations and their causes.

ANT 203 EMBRYOLOGY I (1 CREDIT)

General embryology, gametogenesis, cyclic changes in the female genital tract, fertilisation, cleavage, blastocyst, gastrulation and formation of germ layer, segmentation of mesoderms, folding of embryo-foetal membranes, umbilical cord and placentation and development of limbs and teratology. Development anomalies, clinical syndromes.

ANT 204 EMBRYOLOGY II (2 CREDITS)

Development aspects of cardiovascular system, integumentary sytem, respiratory system, digestive system and urogenital system. Development anomalies, clinical syndromes.

ANT 302 EMBRYOLOGY III (1 CREDIT)

Development of the face and pharyngeal derivatives and teratology and development of nervous systems, sense organs. Development anomalies and clinical syndromes.

**PHYSIOLOGY**

PHS 201 GENERAL PRINCIPLES OF PHYSIOLOGY, BLOOD AND BODY FLUIDS (1 CREDIT)

Introductory and general principles of physiology, homeostasis, physiological variation, cell physiology, membrane potential, the body fluids, excitable tissues and the autonomic system, blood composition, properties, functions, production and fate. Clinical applications.

PHS 202 CARDIOVASCULAR AND RESPIRATORYPHYSIOLOGY (2 CREDITS)

Cardiovascular system – the heart, vascular system, functions in health and disease, respiratory physiology - physiological anatomy, lung volumes, breathing, gas exchange, acid-base balance, adaptation to abnormal environment, metabolic rates and temperature regulation.

PHS 203 GASTROENTEROLOGY AND RENAL PHYSIOLOGY (2 CREDITS)

Gastrointestinal tract – salivary glands, swallowing, peristalsis,. Stomach and its functions, clinical tests of gastric activity, small intestines function and control. The pancreas; biliary system and the liver, bile composition and functions, liver functions. Intestinal digestion, absorption and movement. Defecation, clinical applications. Renal physiology - physiological anatomy, urine formation, acid-base balance, kidney function test, diuretics.

PHS 301 ENDOCRINOLOGY AND REPRODUCTIVE PHYSIOLOGY (2 CREDITS)

Integrative functions, functions and malfunction of hypothalamo-pituitary connections, thyroid, adrenal, pancreatic, parathyroid and other hormones with clinical significance; Reproduction – male and female reproductive organs, nervous coordination, sexual hormone, pregnancy, lactation and contraception.

PHS 302 NERVE, MUSCLE, CENTRAL NERVOUS SYSTEM AND SPECIAL SENSES (2 UNITS)

Neurophysiology – central nervous systems. Organisation and structure, reflex arc. The neuron, impulse synapses, neurotransmitters, sensory system, motor system. Posture, locomotion, speech, sleep-walking mechanism, the hypothalamus, EEG, function of CNS; special senses – structure of the eye, visual system, visual defects, auditory system, structure of the ear, deafness, receptors. Physiology of olfaction.

PHS 201 BASIC PHYSICS IN RADIOLOGY/RADIATION PHYSICS (3 CREDITS)

Electrostatics, physical factors governing capacitance, charging and discharging. Capacitor and their uses in Radiological Equipment, basic X-ray circuitry, etc. Basic computer Architecture and peripherals, electromagnetism; electromagnetic induction, mutual and self induction, principles and construction of the transformer; Transformer parameters, uses of mutual and self inductance in auto transformers and high tension transformers, solid conductor devices, principles and uses in radiology, concept of energy, wave and quantum methods of energy transfer; Bohr's atom; and applications in radiology, rectification, production of x-rays, radioactivity and radioactive decay, half life, counters, units of activity and measurement, k-capture. The atom, isotopes, isobars, isomers, nuclear binding energies, and inverse square law; effects of filtration. Luminescence and their applications. Physics of ultrasound, computed tomography and MRI.

RAD 202 HOSPITAL PRACTICE AND BASIC PATIENT CARE (1 CREDIT)

Basic first aid, principles of nursing, general and special preparation, general and special care, professional attitude of the radiographer. Hygiene; infection and principles of Asepsis special and emergency care of the patient. Use of hospital and nursing equipment. Moving and lifting, drugs hospital practice: The radiographer in the hospital team. Design of radio diagnostic or radiotherapy department. Medico-legal aspects, health services organisation and management. Professional ethics.

RAD 203 PSYCHOLOGY FOR RADIOGRAPHY (1 CREDIT)

The psychology of the sick patient, management of children, the elderly, the disabled. Potentially violent patients, and patients in terminal stages of disease. Communication. Communication with and general care of patients, relatives, professional attitude of a radiographer, relationship with staff, acceptance of responsibility for care of patient motivation and emotional adjustment.

RAD 303 RADIOBIOLOGY/RADIATION PROTECTION AND DOSIMETRY (3 CREDITS)

Cell theory and genetic apparatus, radiation chemistry, effect of radiation on DNA molecules, amino acid, protein etc. cellular damages, survival curves. Theories of biological effects of radiation, short and long term effect (stochastic and non stochastic) radio sensitivity and modifiers, post irradiation clinic events, organ pathology syndromes, evidence of Hiroshima and Nagasaki. Target theory and lethal dose. Units of radiation measurement. Role of international committee on radiological protection, radiation dosimetry and instrumentation. The purpose of the scope of radiation protection. Systems of dose limitation. Radiological design materials, personnel monitoring.

**PAT 301 GENERAL PATHOLOGY (3 CREDITS)**

Introduction to pathology. Tissue and cellular injury. Reaction to cellular injury. Healing and repair. Disturbance of cell growth-cellular adaptation and neoplasia. Principles of general pathology as applies to individual organs with emphasis on those diseases commonly encountered in the environment of hypertension, heart failure, renal tumours, tuberculosis e.t.c.

**RAD 311 RADIOGRAPHY TECHNIQUES I (3 CREDITS)**

Introduction to radiography. Principles of image formation, factors affecting image quality. Radiation protection in a clinical setting. Appropriate technique presentation format. Identification and preparation of the patient for the radiographic examination of the upper extremity:

- a) Fingers, thumb, hand, etc.
- b) Shoulder, girdle and thorax

**RAD 341 CLINICAL POSTING I (4 UNITS)**

Students should attend clinical posting at designated hospitals 12 hrs per week 2 days release.

**RAD 312 RADIOGRAPHIC TECHNIQUE II (3 CREDITS)**

Radiographic technique for lower limb, pelvic girdle and hip. Vertebral column, including cervical, cervicothoracic, thoracic, thoracolumbar etc.

**RAD 321 RADIOGRAPHIC IMAGING I (3 CREDITS)**

Photographic principles. x-ray film materials and structure. The radiographic image, latent image formation, fluorescence and its application in radiography. Intensifying screens, x-ray film cassette, structure, and care, cassette function tests.

**RAD 331 RADIOGRAPHIC EQUIPMENT I (3 CREDITS)**

Mains supply, basic principles of generators including falling load generators and frequency multipliers. Control and stabilizing equipment. Higher tension circuits, meters, exposure timer and switching.

**RAD 301 RADIOGRAPHIC ANATOMY I (2 CREDITS)**

Conventional and contrast radiographic anatomy of systems. Anatomy applied to ultrasound and nuclear medicine; surface anatomy.

**RAD 302 RADIOGRAPHIC ANATOMY II (2 CREDITS)**

Identification and recognition of normal and pathological anatomical structures and physiological processes. Basic manifestations and presentation of various pathological conditions and disease entities on radiographs, covering the major organs and systems of the body.

**RAD 411 RADIOGRAPHIC TECHNIQUES III (3 CREDITS)**

Radiographic examination of the skull, dental radiography, skeletal surveys. Plain radiography of the viscera and soft tissue. Accident and emergency radiography. Introduction to investigations involving contrast media. Pharmacy radiography.

**RAD 412 RADIOGRAPHIC TECHNIQUE IV (3 CREDITS)**

The contrast examination of the gastrointestinal system, excretory system, obstetric and gynaecological examinations. Also sialography, dacrocystography, arthrography, myelography, mammography and operating theatre techniques.

**RAD 403 COMMUNITY HEALTH (2 CREDITS)**

Epidemiology – definition, principles and methods, health education. Environmental health, occupational health. Public health administration/healthcare. Epidemiology of communicable and non-communicable diseases. Social medicine. National and international regulations relating to health.

RAD 431 RADIOGRAPHIC EQUIPMENT II (2 CREDITS)

Fuses, switches, circuit breakers, interlocking circuits. The x-ray tube- construction and operation. High tension cables, tube stands. Effect and control of scatter radiation. General principles of grid, collimators and beam centering devices. Portable and mobile equipment.

RAD 432 RADIOGRAPHIC EQUIPMENT III (2 CREDITS)

Special equipment – tomographic equipment, fluoroscopic equipment, dental equipment, mammographic equipment, equipment for neuroradiography, accident and emergency equipment, image intensifiers, rapid series equipment.

RAD 421 RADIOGRAPHIC IMAGING II (2 CREDITS)

Chemistry of preparing solutions. Hazards, sensitometry, storage of x-ray films. Identification and presentation of radiographs. Viewing of radiographs. Processing – manual and automatic.

RAD 422 RADIOGRAPHIC IMAGING III (2 CREDITS)

Daylight systems. Duplication and subtraction of radiographs. Automated film handling systems. Photography dark room design. Principles of fibre optics and video transmission.

RAD 442 CLINICAL POSTING II AND III ( 5 CREDITS)

Students should attend clinical posting at designated radiology department or imaging department, 15 hours per week.

RAD 451 OTHER IMAGING MODALITIES I (2 CREDITS)

Computerised tomography, ultrasound, instrumentation, basic scanning techniques, patient care, safety precautions, hazards and protection.

RAD 452 OTHER IMAGING MODALITIES I (2 CREDITS)

Magnetic resonance imaging, Radionuclide imaging and thermography. Instrumentation, basic techniques, applications. Patient preparation, safety precautions.

RAD 407 PHARMACOLOGY (1 CREDIT)

Origin and sources of drugs; routes of administration of drugs; pharmacokinetics; absorption of drugs; excretion of drugs; drug toxicity, adverse drug reactions, drug interactions, cholinergic and adrenergic, vomiting – antiemetic, constipation – purgatives; H<sub>2</sub> receptor antagonists, oxygen therapy, bronchodilator drugs; asthma, cough suppressants, respiratory stimulants; anticoagulants – heparin; fibrinolysis; vasodilators; diuretics; renal failure; immunity; major features of malignant disease, principles of cancer chemotherapy; radioactivity; nervous system stimulants; anticonvulsant drugs.

RAD 401 RADIOLOGICAL HEALTH MANAGEMENT (2 UNITS)

Application of managerial functions; health management structure; healthcare policy. Inter-dependence of various departments; radiology department and organisational structure. Financial resources and management. Vital personnel management, management and communication process. Patient flow and appointment system. Public relations. Evaluation of management principles and performance.

RAD 402 BIostatISTICS (2 CREDITS)

Orientation to statistics, definition and examples of basic statistical terminology. Description statistic: tabular and graphical presentations. Populations, samples and the normal distribution. Design of experiments. Introduction to demography in medicine.

Procedures for hypothesis testing. Analysis of variance, correlation and regression. Chi square, non-parametric. Techniques, relative risk and measures of strength of association. Computers and overview.

**RAD 409 RESEARCH METHODOLOGY (2 CREDITS)**

Application of biostatistical tools and methods. Types of scientific enquiry. Research design. Formulation of hypotheses. Data collection methods. Validity and reliability issue and their importance, sensitivity and specificity issues. Methods of data presentation – deductive, inductive and inferences. Ethics of medical research.

**RAD 511 RADIOGRAPHIC TECHNIQUE V (3 CREDITS)**

Other contrast examinations, arterography, venography. Bronchography, ventriculography, encephalography, sinography, fistulography, ward radiography.

**RAD 512 RADIOGRAPHIC TECHNIQUE VI (3 CREDITS)**

Geriatric/paediatric radiography, principles of tomography, macro-radiography, xeroradiography, digital imaging.

**RAD 532 RADIOGRAPHIC EQUIPMENT V (2 CREDITS)**

Practical and troubleshooting knowledge based on all the courses in radiographic equipment.

**RAD 521 RADIOGRAPHIC IMAGING IV (2 CREDITS)**

Silver recovery in imaging, principles of special imaging techniques, video recording, photographic and electronic methods of video image recording and storage, care and protection of videotapes and videodiscs. Subtraction techniques.

**RAD 522 RADIOGRAPHIC IMAGING V (2 CREDITS)**

Practical based on all imaging courses. Students should demonstrate ability to design and guide in the structural set up and functional operation of an x-ray department. Dark

room knowledge, care, maintenance and minor repairs of x-ray dark room equipment, including conventional and daylight system.

**RAD 541 CLINICAL POSTING IV (6 CREDITS)**

Students attend posting in accredited and designated hospitals with adequately equipped imaging department, 19 hours per week.

**RAD 542 CLINICAL POSTING V (6 CREDITS)**

Posting of students to hospitals at least for 8 hours weekly. This forms part of the final clinical examination/ viva voce i.e. continuous assessment.

**RAD 551 RADIOGRAPHY/ONCOLOGY I (2 CREDITS)**

Application of ionising radiation to tumours and other diseases, superficial and deep therapy. Heat and immunotherapy. Nature and types of cancer, staying of cancer causes and management. Radiotherapy and chemotherapy equipment for production of radiation. Therapy beam. Radiation beam measurement/isodose curves. Radiation protection, beam modifiers/applicators. Simulators and their uses, manual and automatic planning.

**RAD 552 RADIOTHERAPY/ONCOLOGY II (2 CREDITS)**

Treatment fields and applications. Radiotherapeutic procedures for selected organs. Mould room and their uses. Management of patients and post-treatment patient care drugs.

**RAD 561 IMAGE CRITIQUE/PATTERN RECOGNITION (1 CREDIT)**

Radiographic film critique and quality control (film faults). Ability to identify common basic faults on radiographs, in order to be able to carry out necessary modification of additional projections.

**RAD 502 SEMINAR (2 CREDITS)**

Presentation of a paper by each student on an approved topic to a departmental colloquium.

**RAD 503 PROJECT (4 CREDITS)**

Each student must produce a bound project report on an approved topic based on any acceptable area of study. It must be a research work carried out by the student under an approved supervisor.

**RAD 562 QUALITY ASSURANCE (2 CREDITS)**

Importance of quality assurance in radiology. Type testing, acceptance testing and on-going quality assurance on the following: Imaging equipment, processing units, image receptors. Management/Evaluation of quality assurance programme.