National Universities Commission

Core Curriculum and Minimum Academic Standards for the Nigerian University System (CCMAS)

Medicine and Dentistry

2023

Ten Unique Features

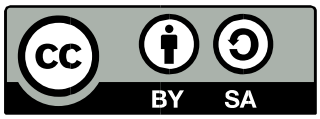
1. The curriculum is horizontally and vertically integrated and taught in semesters leading to four professional examinations that are taken at the conclusion of designated courses which are grouped into Basic Medical Sciences (first professional examination), Basic Clinical Sciences (second professional examination) and Clinical Sciences (third and fourth professional examinations).
2. For horizontal integration, systemwide courses are taught across subjects in same semesters and levels. For instance, the anatomy of the thorax and abdomen, including histology, is taught at the same level and semester in the curriculum during which gastro-intestinal, renal and respiratory physiology is also taught.
3. For vertical integration, courses overlap into semesters and levels preceding those at which their professional examinations are to be held. This action ensures that the Basic Medical Sciences, Basic Clinical Sciences and the Clinical Sciences courses are integrated, overlap and flow into one another. They are therefore not in strict compartments as far as years of teaching as indicated by the levels (200-600) are concerned.
4. The curriculum is competency-based and attuned to the needs of society by being strongly community oriented.
5. Teaching is in line with identified learning objectives and the acquisition of practical skills which are in sync with the philosophy of the discipline.
6. Prolonged didactic lectures are discouraged while self-learning in small groups and seminars is encouraged. This reduction in the time for didactic lectures frees up time for some leisure, some free weekends and resit professional examinations.
7. Emphasis is placed on satisfactory knowledge base, teamwork, ethical responsibility and digital literacy and the proficient use of modern digital equipment including computers and ICT facilities in patient care and data management.
8. The acquisition of clinical skills is introduced early at the 200 level and learning outcomes are clearly defined for each subject that is taught in the curriculum.
9. Related issues in health care such as bioethics, medical jurisprudence, alternative medicine, health care management and administration, entrepreneurship are taught and examined.
10. The degrees that the curriculum leads to: Bachelor of Medicine, Bachelor of Surgery as well as the Bachelor of Dental Surgery are unclassified. But the curriculum is structured on the course credit and grade point average system to enhance issuance of academic transcripts, inter university transfers, award of prizes and in conformity with international best practices.

Executive Secretary: Abubakar Adamu Rasheed

This publication is available in Open Access under the Attribution-ShareAlike 3.0 IGO (CC-BY-SA 3.0 IGO) licence (http://creativecommons.org/licenses/by-sa/3.0/igo/). By using the content of this publication, the users accept to be bound by the terms of use of the license.

The present licence applies exclusively to the text content of the publication. For the use of any material not clearly identified as belonging to the National Universities Commission, prior permission shall be requested from: publication.copyright@nuc.edu.ng

This publication can be referenced as: *Core Curriculum and Minimum Academic Standards (CCMAS) for Nigerian Universities*



For more information, please contact:
Executive Secretary, National Universities Commission
26 Aguiyi Ironsi Street, P.M.B. 237 Garki GPO, Maitama, Abuja, Nigeria
Telephone:+2348027455412,+234054407741.Email: info@nuc.edu.ng.
Website: www.nuc.edu.ng

Lead Consultant: Peter A. Okebukola
Coordinating NUC Director: Dr. Noel Biodun Saliu

Formally unveiled by

His Excellency, Professor Yemi Osinbajo, *SAN, GCON*
Vice President, Federal Republic of Nigeria

Board of the National Universities Commission
(During the period of development of the CCMAS)

Emeritus Professor Ayo Banjo **(Chairman)**
Professor Abubakar A. Rasheed **(Executive Secretary)**
Chief Johnson Osinugo
Hon. Ubong Donald Etiebet
Dr. Dogara Bashir
Dr. Babatunde M. Olokun
Alh. Abdulsalam Moyosore
Mr. Yakubu Aliyu
Professor Rahila Plangnan Gowon
Professor Sunday A. Bwala
Professor Mala Mohammed Daura
Professor Joseph Atubokiki Ajienka
Professor Anthony N. Okere
Professor Hussaini M. Tukur
Professor Afis Ayinde Oladosu
Professor I. O. Smith
Perm. Sec. Fed. Min. of Education
Perm. Sec. Fed. Min. of Finance
Perm. Sec. Fed. Min. of Health
Perm. Sec. Fed. Min. of Women Affairs & Soc. Dev.
Perm. Sec. Service Policies & Strategies Office, OHCSF

NUC Management
(During the period of development of the CCMAS)

Professor Abubakar A. Rasheed **(Executive Secretary and Chairman)**
Dr. Suleiman Ramon-Yusuf (Deputy Executive Secretary)
Mr. Sam M. Onazi (Director, Finance and Accounts) (now Deputy ES, Management Services)
Dr. Noel B. Saliu (Director, Academic Planning)
Mr. Chris J. Maiyaki (Director, Executive Secretary's Office) (now Deputy ES, Administration)
Mrs. Constance Goddy-Nnadi (Director, Establishment of Private Universities)
Mr. Ibrahim U. Yakasai (Director, Public Affairs)
Dr. (Mrs.) Maryam Sali (now late) (Director, Accreditation)
Mr. Boniface C. Odum (Director, Human Resources)
Mrs. Lauretta N. Achor (Ag. Director, Students)
Mal. Lawal M. Faruk (Ag. Director, Research, Innovation and Information Technology)
Engr. Kayode S. Odedina (Ag. Director, Open, Distance and e-Learning)
Mr. Ashafa Ladan (Ag. Director, Skills Development and Entrepreneurship)
Mrs. Lydia Imoroa (Ag. Director, Inspection and Monitoring) (now substantive Director)
Mr. Jide Olukoju (Deputy Director, Physical Planning and Development)
Mr. Musa Zamuna (Deputy Director, Internationalization)
Mal. Kabiru Abdullahi (Deputy Director, Establishment Matters)
Mrs. Rita U. Kenny-Ogwu (Deputy Director, Audit)
Engr. Adamu H. Yakasai (Deputy Director, Procurement)
Arc. Ikani Samuel (Deputy Director, Programme Accreditation)
Barr. S.S. Adejoh (Director, Resource and Strategic Planning)
Mr. Lawal Haruna Ajo (Deputy Director, Information)
Mr. Mustapha Rasheed (Deputy Director, Master Plan and Infrastructure)
Mrs. Margaret Oyedele (Deputy Director, IWES)

Mr. Obi Ukwuagu (Deputy Director, Information and Communication Technology)
Mrs. Alissabatu Balogun (Deputy Director, Federal University Monitoring)
Barr. Paschal Eruaga (Chief Legal Officer)

NUC Strategy Advisory Committee

Professor Peter Okebukola, OFR	-	Chairman
Professor Ruqayyatu Ahmed Rufa'i, OON	-	Member
Professor Gambo Laraba Abdullahi	-	Member
Professor Nimi Briggs, OON	-	Member
Professor Michael Faborode	-	Member
Professor Attahiru Jega, OFR	-	Member
Professor Chiedu F. Mafiana	-	Member
Mr. Tope Toogun	-	Member
Dr. Suleiman Ramon-Yusuf	-	Member
Dr. Noel Biodun Saliu	-	Member
Mr. Christopher Maiyaki	-	Member
Dr. Maryam Sali (late)	-	Member
Dr. Joshua Atah	-	Secretary

Foreword

In furtherance of the "change" mantra of the present administration, I published a roadmap to guide my Ministry on ways of addressing the multiple problems that faced the education sector of the country shortly after my assumption of office in 2016. Known as "***Education for Change: Ministerial Strategic Plan – 2016-2019"*** (updated to 2018-2022), the content of the document reaffirms government's commitment to strengthening institutional structures and establishing innovative approaches that would quickly revamp the education sector.

The nations' universities hold a pride of place in the execution of such a strategy, being at the peak of the educational system and charged in an overall manner, with the responsibility of catalysing the sustainable and inclusive growth and prosperity that the "change" mantra envisions. Thus, a "rapid revitalization of the Nigerian university system", which is proceeding apace, became imperative. Improvement in research, teaching and learning facilities, deepening ICT penetration and the provision of enhanced power supply in our university campuses are some of the areas receiving stringent attention. In the same vein, the need was felt to radically review the curricula which universities had used for more than a decade so as to put in place one that would more directly address local issues, meet international standards and is fit for purpose for the training of 21st century graduates.

The National Universities Commission has concluded the review of the former *Benchmark Minimum Academic Standards (BMAS)* of 14 disciplines into those of Core *Curriculum and Minimum Academic Standards (CCMAS)* of 17 disciplines. I am therefore pleased to present these documents to the universities, the general public and the international community as I am sure that their application would tremendously uplift scholarship in our universities. I thank all and sundry who worked assiduously to bring this seminal enterprise to fruition.

Malam Adamu Adamu
Honourable Minister of Education

Preface

Section 10 (1) of the Education (National Minimum Standards and Establishment of Institutions) Act, Cap E3, Laws of the Federation of Nigeria 2004, empowers the National Universities Commission to lay down minimum standards for all universities and other degree awarding institutions of higher learning in the Federation and the accreditation of their degrees and other academic awards. The earliest efforts at giving effect to this legal framework in the Nigerian University System (NUS) started in 1989 following the collaboration between the Commission and Nigerian Universities, which led to the development of the Minimum Academic Standards (MAS) for all programmes in Nigerian universities. The MAS documents were subsequently approved by the Federal Government for use as a major instrument for quality assurance in the Nigerian University System (NUS). The documents were employed in the accreditation of programmes in the NUS for over a decade.

In 2001, the Commission initiated a process to revise the documents because the said MAS documents were essentially content-based and merely prescriptive. In 2004, the Commission developed outcome-based benchmark statements for all the programmes through a workshop that allowed for exhaustive deliberations by relevant stakeholders. Following comments and feedback from the universities to the effect that the Benchmark-style Statements were too sketchy to meaningfully guide the development of curriculum and inadequate for the purpose of accreditation, the Commission, in 2007 put in place a mechanism for the merger of the Benchmark-style Statements and the revised Minimum Academic Standards, which birthed the Benchmark Minimum Academic Standards (BMAS). The resultant BMAS, an amalgam of the outcome-based Benchmark statements and the content-based MAS clearly articulated the Learning Outcomes and competencies expected of graduates of each academic programme in Nigerian Universities without being overly prescriptive while at the same time providing the requisite flexibility and innovativeness consistent with institutional autonomy. In all, the BMAS documents were developed for the thirteen existing disciplines namely, **Administration and Management, Agriculture, Arts, Basic Medical Sciences, Education, Engineering and Technology, Environmental Sciences, Law, Medicine and Dentistry, Pharmaceutical Science, Sciences, Social Sciences and Veterinary Medicine.**

The Commission, in 2016, in its sustained commitment to make the NUS adaptable to global trends in higher education, constituted a group of relevant academic experts to develop a BMAS in **Computing**, thus increasing the number of disciplines in Nigerian Universities to fourteen.

In keeping with its mandate of making university education in Nigeria more responsive to the needs of the society, the National Universities Commission commenced the journey to restructure the BMAS in 2018, introducing in its place, the **Core Curriculum and Minimum Academic Standards (CCMAS),** to reflect the 21st Century realities, in the existing and new disciplines and programmes in the Nigerian University System.

The new CCMAS is a product of sustained stakeholder interactions over two years. The composition of each pwanel took into consideration, the triple helix model, as a unique feature. This involved a blend of academic experts, academies, government (represented by NUC), professional bodies and of course, the private sector represented by the Nigerian Economic Summit Group (NESG). In order to enrich the draft documents, copies of each discipline were forwarded to all critical stakeholders including the relevant academic units in Nigerian Universities, the private sector, professional bodies and the academies for their comments and input. These inputs along with the curriculum of programmes obtained from some foreign

and renowned universities served as major working materials for the various panels constituted for that purpose.

Bearing in mind the need to adhere to covid-19 protocol as prescribed by the National Centre for Disease Control (NCDC), the Commission was compelled by prevailing circumstances to finalize the curriculum virtually. General Assemblies were also held via Zoom, comprising, the NUC Strategic Advisory Committee (STRADVCOM), Chairpersons/Co-Chairpersons of the various disciplines and Panel Members of the respective programmes. Each Discipline and Programme had NUC representatives who assisted panellists with all the tools and working materials. Several online meetings were held at programmes level, where the real business of developing the CCMAS took place. The products of the various programme-based virtual meetings were submitted to the corresponding discipline group and then to the National Universities Commission. These documents were further scrutinized and fine-tuned by a smaller group of versatile subject matter specialists and relevant private sector practitioners.

In line with the dynamism in higher education provisioning, the Commission took cognizance of complaints by the universities on the high number of General Studies (GST) courses in the BMAS, and was subsequently streamlined. Entrepreneurship courses such as Venture Creation and Entrepreneurship, and innovation found generous space. In addition, the new curriculum unbundled the Bachelor of Agriculture, Bachelor of Science in Mass Communication and the Bachelor of Architecture Programmes, while establishing some emerging specializations in these fields as obtained globally. This is in furtherance of the goal of producing fit for purpose graduates. The Allied Health Sciences was also carved out as a new Discipline from the existing Basic Medical Sciences discipline.

Preceding the completion of the curriculum review content and language editing, a 3-day validation workshop (face-to-face mode) involving critical stakeholders, including STRADVCOM, Vice-Chancellors and Directors of Academic Planning of Nigerian Universities, as well as the Nigerian Economic Summit Group (NESG) was organized by the Commission to validate the CCMAS documents, and to engender ownership for ease of implementation.

Consequent upon the afore-mentioned processes, seventeen CCMAS documents were produced for the following academic disciplines in the NUS:

1. Administration and Management
2. Agriculture
3. Allied Health Sciences
4. Architecture
5. Arts
6. Basic Medical Sciences
7. Computing
8. Communication and Media Studies
9. Education
10. Engineering and Technology
11. Environmental Sciences
12. Law
13. Medicine and Dentistry
14. Pharmaceutical Science
15. Sciences
16. Social Sciences
17. Veterinary Medicine

The CCMAS documents are uniquely structured to provide for 70% of core courses for each programme, while allowing universities to utilise the remaining 30% for other innovative courses in their peculiar areas of focus. In addition to the overall Learning Outcomes for each discipline, there are also Learning Outcomes for each programme and course. In general, programmes are typically structured such that a student does not carry less than 30 credit units or more than 48 credit units per session.

Consequently, the Commission is optimistic that the 2021 CCMAS documents will serve as a guide to Nigerian Universities in the design of curriculum for their programmes with regards to the minimum acceptable standards of input and process, as well as, measurable benchmark of knowledge, 21st century skills and competences expected to be acquired by an average graduate of each of the academic programmes, for self, national and global relevance.

Professor Abubakar Adamu Rasheed, *mni, MFR, FNAL*
Executive Secretary

List of Reviewers

Title	Surname	First Name	Institution	Programme
Emeritus Professor	BRIGGS	Nimi	University of Port-Harcourt, Port-Harcourt	**Chairman**/Medicine & Surgery
Professor	OGUNBODEDE	Eyitope	Obafemi Awolowo University, Ile-Ife	**Co-Chairman**/ Dentistry
Professor	YAKASAI	Ibrahim	Bayero University, Kano	Medicine & Surgery
Professor	BORODO	Musa	National Postgraduate Medical College of Nigeria	Medicine & Surgery
Professor	IKECHEBELU	Joseph	Nnamdi Azikiwe University, Awka/ West African College of Surgeons	Medicine & Surgery
Professor	OLAPADE-OLAOPA	Emiola	University of Ibadan, Ibadan	Medicine & Surgery
Professor	MBAKWEM	Amam	University of Lagos, Lagos	Medicine & Surgery
Professor	ALAUSA	Olanipekun	Babcock University, Ilishan Remo	Medicine & Surgery
Professor	USANG	Usang	University of Calabar, Calabar	Medicine & Surgery
Professor	ALEBIOSU	Olutayo	Osun State University, Osogbo	Medicine & Surgery
Associate Professor	MOHAMMED	Idris	Bayero University, Kano	Medicine & Surgery
Dr.	NWAKANMA	Nnaemeka	Medical and Dental Council of Nigeria, Abuja	Medicine & Surgery/Dentistry
Professor	OKE	Gbemisola	University of Ibadan, Ibadan	Dentistry
Professor	FASOLA	Abiodun	University of Ibadan, Ibadan	Dentistry
Professor	SOFOLA	Oyinkansola	University of Lagos, Lagos	Dentistry
Professor	ADEBOLA	Adetokunbo	Bayero University, Kano	Dentistry
Professor	OKEIGBEMEN	Sunny	University of Benin, Benin	Dentistry
Associate Professor	OZIEGBE	Elizabeth	Obafemi Awolowo University, Ile-Ife	Dentistry

National Universities Commission Representatives

Title	Surname	First Name	Programme
Dr.	AUDU	Bridget	**Discipline Representative**/Medicine & Surgery
Dr.	IRENE	Angela	Dentistry

Contents

Introduction

Two Acts provide the legal framework for the quality assurance and regulatory mandates of the National Universities Commission. The first is the **National Universities Commission Act No. N81 Laws of Federation Nigeria (L.F.N.) 2004**.

This Act sets up the National Universities Commission as a body corporate charged with the responsibility of advising the Federal and State Governments of all aspects of university education and the general development of universities in Nigeria. The second, **Education (National Minimum Standard and Establishment of Institutions) Act No. E3 L.F.N. 2004**, *empowers the National Universities Commission to lay down minimum standards for all universities and other institutions of higher learning in the Federation and the accreditation of their degrees and other academic awards in formal consultation with the universities for that purpose, after obtaining prior approval therefor through the Minister, from the President.*

Following the enactment of NUC Act No. E3 L.F.N. 2004, the National Universities Commission developed the first set of Minimum Academic Standards (MAS) in 1989 for all the academic programmes existing in the Nigerian University System (NUS) at that time under the 13 major disciplines of Administration, Agriculture, Arts, Education, Engineering and Technology, Environmental Sciences, Law, Medicine and Dentistry, Management Sciences, Pharmaceutical Science , Science, Social Sciences and Veterinary Medicine. The Minimum Academic Standard served as the reference documents for the first accreditation of programmes conducted in NUS in 1990.

In its bid to review the Minimum Academic Standard documents, which was predicated on the fact that they were prescriptive, the Commission decided to develop the outcome-based Benchmark Statements for all programmes in the Nigerian University System in line with contemporary global practice in 1999. In the first comprehensive review of the Minimum Academic Standards by NUC, which was in 2004, the Commission decided to merge the Benchmark Statements and the revised Minimum Academic Standards into a new document called Benchmark Minimum Academic Standards (BMAS). These documents were approved for use in Nigerian universities in 2007. A second attempt at reviewing the BMAS was in 2011. It must however be noted that stand alone BMAS for new programmes were at different times developed by the Commission on request from some Nigerian universities.

The Current Review of the BMAS

The journey of the current curriculum review efforts commenced in 2018, when the National Universities Commission circulated the 2018 draft BMAS to all Nigerian universities and other stakeholders for their comments. In addition to the harvested comments, the curriculum of different programmes of some world-class universities were downloaded. The draft 2018 BMAS, compiled comments of Nigerian universities and other stakeholders and the downloaded curriculum of some foreign universities served as the working documents for the curriculum review panels. A multi-stakeholder approach was deployed in constituting the panels for the curriculum review exercise. The constituted panels included:

i. Academic staff of Nigerian universities;
ii. Representatives of the Academies;
iii. Representatives of Professional bodies/associations; and
iv. Representatives of the private sector.

In addition to the reviewers working individually and in consultation with their subject area peers, over 512 cumulative online meetings of the general assembly (Vice-Chancellors, Discipline Chairmen/Chairpersons, programme-specific reviewers and Heads/representatives of international quality assurance agencies and institutions); Discipline groups; and programme groups were held between March and November, 2021. Physical meetings were also held to finalize the curriculum review exercise.

The reviewers carried out their assignments with a view to producing a curriculum for their respective programmes that will reflect both national and international expectations. Specifically, the reviewers focused on ensuring that the emerging curriculum will be adequate to train Nigerian university students in the 21st Century. By implication and in addition to current trends in the various programmatic areas, the curriculum will be ICT oriented, promote Artificial Intelligence, enhance skills acquisition (including soft skills), inculcate and sharpen entrepreneurship mindset of students and capable of steering the deployment of evolving technologies to deliver its content.

The Core Curriculum and Minimum Academic Standards (CCMAS)
The major highlights of the new curriculum are:

1. Change of nomenclature from **Benchmarks Minimum Academic Standards (BMAS)** to **Core Curriculum and Minimum Academic Standards (CCMAS);**
2. The curriculum provides for 70% minimum core courses requirements for graduation. Nigerian universities are expected to provide the remaining 30%;
3. In consonance with global best practice, the curriculum is to stimulate blended learning in its delivery;
4. Mass Communication has been unbundled to create a distinct discipline of Communications comprising degree programmes in Advertising, Broadcasting, Development Communication Studies, Film and Multimedia, Information and Media Studies, Journalism and Media Studies, Mass Communication, Public Relations and Strategic Communication;
5. Agriculture has been unbundled into programmes in its contributing components of B.Sc Agricultural Economics, B.Sc. Animal Science, B.Sc. Crop Science and B.Sc. Soil Science;
6. The unbundling of Architecture and introduction of Architecture as a new discipline with programmes like Architecture, Architectural Technology, Furniture Design, Interior Architecture Design, Landscape Architecture and Naval architecture;
7. The split of the Basic Medical Sciences discipline into two – Basic Medical Sciences and Allied Health Sciences;
8. Reduction of the General Studies (GST) course from 36 credit units to 12 credit units of 6 courses as follows:
    i. Communication in English;
    ii. Nigerian People and Culture;
    iii. Philosophy, Logic and Human Existence;
    iv. Entrepreneurship and Innovation;
    v. Venture creation; and
    vi. Peace and Conflict resolution.
9. Entrepreneurship has been repackaged with the introduction of programme-specific entrepreneurship;
10. The number of academic disciplines has been increased from 14 to 17 as follows:

    i. Administration and Management
    ii. Agriculture

iii. Allied Health Sciences
iv. Architecture
v. Arts
vi. Basic Medical Sciences
vii. Communications and Media Studies
viii. Computing
ix. Education
x. Engineering and Technology
xi. Environmental Sciences
xii. Law
xiii. Medicine and Dentistry
xiv. Pharmaceutical Science
xv. Sciences
xvi. Social Sciences
xvii. Veterinary Medicine

Having reviewed the curriculum of Nigerian universities, the next steps will include training and retraining of academic staff of Nigerian universities to effectively deliver the content of the curriculum.

Preamble

The Core Curriculum and Minimum Academic Standards (CCMAS) are to be used for the undergraduate training in Medicine and Dentistry programmes in Nigeria.

It is pertinent to note that this CCMAS document is expected to guide institutions in the design of curricula for their Medicine and Dentistry programmes by stipulating the minimum requirements. Being such, institutions are encouraged to take due cognizance of the CCMAS while bringing necessary innovation to the content and delivery of their programmes towards achieving the overall goal of Medicine and Dentistry education and training in the country.

Programmes and Degrees

The programmes are **Medicine** and **Dentistry** which cover the following degree areas.

Table 1:1 List of Programmes and Degrees

S/N	Programme	Degree (s) in View
1.	Medicine and Surgery	Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB)
2.	Dentistry	Bachelor of Dental Surgery (BDS/BChD)

The profile of NUC-approved programmes in Medicine and Dentistry in the Nigerian university system reflects the current status of the exponential growth in the medical and dental curricular since the time when Medicine programme was first estblished in 1948 at University College, Ibadan (now University of Ibadan). The Nigerian population is underserviced by medical personnel whose distribution is grossly skewed against rural areas, hence the continued expansion of the medical programmes in order to meet the ever rising demands of medical services. The CCMAS should be deligently implemented by the universities running the MBBS/MBChB and BDS/BChD programmes in order to guarantee quality medical and dental services to the populace.

Overview

Two programmes are taught under this discipline. One programme leads to the Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB) degree while the other leads to the Bachelor of Dental Surgery (BDS/BChD) degree. The two programmes are similar, and students take virtually the same courses up until the 400 level. The early parts of the curriculum that deal with issues of philosophy, mission, aims and objectives and others, are common to the two programmes.

The curriculum is unique in several respects and is designed to enable the graduate to meet the needs of a rapidly changing practice environment

Philosophy, Aims and Objectives of Medicine and Dentistry

Philosophy

The education of health professionals must be attuned to the health needs of the society. This commitment should be reflected in a competency-directed and community-oriented approach in the training of the health professional with emphasis on social responsiveness and relevance, as well as life-long learning.

Objectives
The Bachelor of Medicine, Bachelor of Surgery and the Bachelor of Dental Surgery curricula are each designed for a six-year period, inclusive of the 100-level programme.

The broad objectives are to:
1. promote the production and development of medical doctors and dentists with sound knowledge in physiological, anatomical and biochemical processes in the human body that would lead to the understanding of various diseases;
2. produce medical doctors and dentists who are proficient in clinical clerkship and the use of modern technology for the diagnosis and management of patients;
3. produce medical doctors and dentists capable of understanding diseases and their manifestations using laboratory and pathological skills and knowledge, including the determination of the effect of diseases on the lives of individuals and persons in the community;
4. train medical doctors and dentists with sound knowledge and understanding of causes of diseases at the individual and community levels, and other public health challenges using evidence-based methods;
5. train medical doctors and dentists with an in-depth knowledge of therapeutics and with ability to determine drug actions in their patients;
6. produce medical doctors and dentists with knowledge of ethical principles of the medical profession to attend to diverse ethical situations in the multicultural setting of the Nigerian Nation and other cultures;
7. produce medical doctors and dentists as professionals who are polite, considerate, trustworthy, honest, act with integrity, maintain confidentially, respect patients' dignity and privacy;
8. inculcate into the medical doctors and dentists the spirit of teamwork and multi-disciplinary approach to medical practice;
9. produce medical doctors and dentists with sound theoretical knowledge and skills capable of undertaking research in various fields of the medical and dental professions;
10. produce medical doctors and dentists as professionals who recognise the principles of patient-centered care, including self-care, and deal with patients' healthcare needs in consultation with them and, where appropriate, their relatives or carers; and
11. produce medical doctors and dentists with skills for life-long and self-directed learning.

Learning Outcomes

Domain of Knowledge
At the end of the training, graduates of the medical and dental degrees should be able to:
1. identify and understand diseases using knowledge and skills acquired in the basic medical, basic clinical and clinical sciences;
2. utilise investigative and diagnostic results to determine the various causes of diseases, their modes of transmission, manifestations and appropriate channels of management;
3. understand the structure and functions of healthcare delivery systems, including their maintenance and the utilisation of public health principles in the prevention of diseases; and
4. apply basic research tools at both the patient and community levels to answer research questions.

Skills and Competencies
At the end of the training, graduates should be able to:
1. apply scientific knowledge and available medical literature in the interpretation of diagnostic results;

2. demonstrate the use of common diagnostic and therapeutic instruments and appliances;
3. competently undertake various clinical procedures;
4. competently communicate with patients, colleagues and the general public;
5. demonstrate high level reasoning ability in solving clinical problems;
6. diagnose common illnesses among patients based on their history, physical examination and laboratory data/information;
7. develop a management plan based on competent medical evaluation of patients and relevant laboratory investigation results;
8. respond promptly as appropriate to medical/dental emergencies and work effectively with other health related professionals;
9. be digitally literate and proficient in the use of modern digital instruments including the computer and other ICT facilities in patient care and data management; and
10. seek for sources of information and materials in support of life-long learning on issues of health and disease.

Behavioural Attributes

Graduates of this discipline should be able to:

1. show sensitivity, honesty, comportment and integrity in their personal life and in the care of all patients, displaying utmost privacy, respect and dignity;
2. professionally communicate information to patients and relevant authority;
3. demonstrate leadership skills and promote the health and well-being of the host community;
4. work in a team alongside other health care professionals; and
5. dress and appear decently and appropriately, especially when attending to patients.

Admission and Graduation Requirements

Admission Requirements

Six-Year Programme

1. In addition to acceptable scores in the Unified Tertiary Matriculation Examination (UTME), candidates to be admitted into the degree programmes shall possess a credit pass in each of the following: Physics, Chemistry, Biology, Mathematics and English language at the Senior Secondary Certificate (SSC) or their equivalents at one sitting.
2. In addition, they will sit for and obtain an acceptable score for the university they wish to be admitted into at the Joint Admission and Matriculation Examination as well as the post UTME.

Five-Year Programme

1. Candidates who possess relevant 'A' level passes in Physics, Chemistry and Biology/Zoology.
2. Holders of first degrees in relevant science areas may also be admitted through the direct entry mode.
3. Candidates seeking direct entry into the programmes should in addition have credit passes in Physics, Chemistry, Biology, Mathematics and English language at the SSC or their equivalents at one sitting.
4. In addition, they will register for and be admitted through the Joint Admission and Matriculation Board as well as the post UTME and screening of the respective University.

Duration of the Programmes

Each of the programmes in Medicine and Dentistry shall be for a minimum of six (6) years consisting of one year of basic sciences, two years of basic medical sciences, one year of basic clinical sciences and two years of clinical sciences. Other than the one year of basic sciences,

the periods for the basic medical, basic clinical and clinical sciences courses are not in strict compartments as they overlap slightly during the course of the programmes.

Graduation Requirements

1. To graduate from the MBBS/MBChB or BDS/BChD degree programmes**,** a student shall have undergone six (6) or five (5) academic sessions depending on the admission entry mode, Six Year Programme or Five Year Programme.
2. The student must have passed all prescribed professional examinations (from 200 level) with a score of not less than 50% in each course. For the clinical courses, a pass (minimum of 50% score) in the clinical component of each examination is also required. To graduate, a student must be found worthy in character throughout the period of his/her course of study. The student must also submit the report of a supervised research project.
3. The MBBS/MBChB and the BDS/BChD degrees shall remain unclassified according to the CGPA but excellence may be recognised through the award of distinctions.

Course System

This should be understood to mean a quantitative system of organisation of the curriculum in which subject areas are broken down into course units which can be examined and for which students earn credit(s). However, this should not be taken to mean that there is complete compartmentalisation between the subject matter in the various courses. Some of the advantages of this system are that all components of courses are taught and examined with organised structuring of the courses.

The MBBS/MBChB or the BDS/BChD programme is taught and examined as sessional programme courses with professional examinations taken at the completion of each phase of the training.

But for standardisation and quantification, courses taught are packaged into credit units assigned to semesters. This has the advantage of allowing an in-depth assessment for the purpose of producing academic transcripts for postgraduate admissions, interfaculty transfers and assessing conformity to regulatory requirements like those of the World Federation for Medical Education (WFME).

The courses are arranged in levels of academic progress such as Level 2 or Year 2 courses are 201, 202 and Level 5 or Year 5 courses are 501, 502. Furthermore, courses are assigned weights called Credit units.

Credit Units

Credit units consist of specified number of student-teacher contact hours per week per semester. Credit units are used in two complementary ways, one, as a measure of course weighting, and the other, as an indicator of student workload. The total credit unit carried by medical and dental students is without prejudice to what is approved by Senates of universities for other degree programmes.

As a measure of course weighting for each unit course (such as ANA 201, PHY 203, MED 604), the credit unit to be earned for satisfactorily completing the course is specified, such as a 2-credit unit course may mean 1-hour lecture plus 3 hours of practical per week per semester.

As a measure of workload, 'One Credit Unit' applies to the following activities:

1. 15 lectures of one hour each per week;
2. Tutorial sessions of 45 hours;
3. Seminars of 45 hours; and
4. Laboratory or field work, clinical practice/practicum, studio practice or stadium sporting activity of 45 hours.

Grading of Courses

1. A grading system using both letter (A-F) and number (5-0) should be adopted.
2. The scoring and grading are as shown in table 1.2 below.
3. A minimum pass mark of 50% (letter Grade C) at all examinations should be adopted for the MBBS/MBChB and BDS/BChD programmes. In addition to continuous assessment tests, examinations should be administered at the end of each course. For the clinical courses, a pass in the clinical component of each examination is also required.

Table 1.2 Scoring and Grading System

Credit Units	Percentage Scores	Letter Grades	Grade Points (GP)
(Vary according to contact hours assigned to each course per week per semester and according to workload carried by student)	70-100 (Distinction) 60-69 50-59 45-49 40-44 0-39	A B C D E F	5 4 3 2 1 0

Grade Point Average and Cumulative Grade Point Average

Grade Point Average (GPA)

Performance in any semester is reported in Grade Point Average. This is the average of weighted grade points earned in the courses taken during the semester. The Grade Point Average is obtained by multiplying the Grade Point average in each course by the number of Units assigned to that course, and then summing these up and dividing by the total number of Units taken for the semester.

Cumulative Grade Point Average (CGPA)

This is the up-to-date mean of the Grade Points earned by the student in a programme of study. It is an indication of the student's overall performance at any point in the training programme. To compute the Cumulative Grade Point Average, the total of Grade Points multiplied by the respective units for all the semesters are added and then divided by the total number of units for all courses registered by the student.

Degree Classification

The MBBS/MBChB and the BDS/BChD degrees shall remain unclassified according to the CGPA. Excellence may be recognised through the awards of distinctions and prizes. Furthermore, the CGPA may be used for the issue of academic transcripts and determination of candidates for university wide prizes and awards.

Evaluation

Students should be assessed using both 'formative' and 'summative' examinations.

1. **Formative (mock) examinations**

   These tests are conducted at least once every posting prior to the summative examinations to give the students feedback on their performance to improve their learning. The formative examinations should simulate the summative assessments in order to also prepare the students for the latter.

2. **Summative examinations**

   These consequential examinations include all tests that determine the students' progress during the course i.e. continuous assessments and professional final examinations.

Techniques of Students' Assessment

The techniques of students' assessment shall be by continuous assessment and end of course professional examinations. Continuous assessment of students shall be by means of term papers, frequent tests (formal and in-formal), assessment in workshop/laboratory/field/clinics/assignments, as may be applicable, which should constitute a minimum of 30% of the year's assessment. The weightings for each of the professional examinations shall be a maximum of 70%.

External Examiners' Systems

External examiners shall be used during the professional examinations in medicine and dentistry to certify the overall performance of the students and the quality of facilities and teaching. This serves as an external quality assurance system designed to review the standard of examination questions, marking schemes and answer scripts and departmental activities. External examiners should participate actively in clinical as well as oral examinations.

Student's Evaluation of Courses

It is desirable to assess the quality of teaching both by peers and students. This could be by way of questionnaire.

Maintenance of Curricular Relevance

Medical schools should embrace the development, review and utilisation of tools for monitoring curricular implementation and evaluation. They should establish a permanent mechanism with the creation of a curriculum committee to specifically undertake annual evaluation of programmes and teachers while the review and reforms of the curriculum shall take place at least once every five (5) years.

Performance Evaluation Criteria

The general performance indices to be used for accreditation by internal and external assessors shall include adequacy of staff of all categories, physical facilities and space, equipment and instrument, library facilities and funding. The students' pass rate and employers' acceptance of graduates of the programmes shall be part of the indices. It is also desirable to assess the quality of teaching both by peers and students.

Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB)

Overview

The curriculum is designed to give prospective students opportunity to acquire a degree in Medicine, Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB). The design of the programme encourages students to develop a culture of life-long learning and be able to apply the knowledge of basic medical, basic clinical and clinical sciences in an ever-changing field of medicine. Emphasis is placed on acquisition of practical skills and technologies to face emerging global public health challenges. The programme provides the students with a sound understanding of the 21st century health problems while equipping them with a wide range of modern diagnostic, therapeutic and preventive approaches to curb these problems. The curriculum is unique in several respects and is designed to enable the graduate to meet the needs of a rapidly changing practice environment.

Philosophy

To produce 21st century medical doctors equipped with knowledge and skills to apply known and innovative approaches to solve the healthcare challenges facing our society today and in the future. This commitment is reflected in a competency-directed and community-oriented approach in the training of the health professional with emphasis on social responsiveness and relevance, as well as life-long learning.

Objectives

The Bachelor of Medicine and Bachelor of Surgery curriculum is designed for a six-year period, inclusive of the 100-level programme.

The broad objectives are to:

1. promote the production and development of medical doctors with sound knowledge in physiological, anatomical and biochemical processes in the human body that would lead to the understanding of various diseases;
2. produce medical doctors who are proficient in clinical clerkship and the use of modern technology for the diagnosis and management of patients;
3. produce medical doctors capable of understanding diseases and their manifestations using laboratory and pathological skills and knowledge, including the determination of the effect of diseases on the lives of individuals and persons in the community;
4. train medical doctors with sound knowledge and understanding of causes of diseases at the individual and community levels, and other public health challenges using evidence-based methods;
5. train medical doctors with an in-depth knowledge of therapeutics and with ability to determine drug actions in their patients;
6. produce medical doctors with knowledge of ethical principles of the medical profession to attend to diverse ethical situations in the multicultural setting of the Nigerian Nation and other cultures;
7. produce medical doctors as professionals who are polite, considerate, trustworthy, honest, act with integrity, maintain confidentially, respect patients' dignity and privacy;
8. inculcate into the medical doctors and dentists the spirit of teamwork and multi-disciplinary approach to medical practice;
9. produce medical doctors with sound theoretical knowledge and skills capable of undertaking research in various fields of the medical and dental professions;

10. produce medical doctors as professionals who recognise the principles of patient-centered care, including self-care, and deal with patients' healthcare needs in consultation with them and, where appropriate, their relatives or carers; and
11. produce medical doctors with skills for life-long and self-directed learning.

Unique Features of the Programme

The unique features of the programme are:

1. the core curriculum includes the 100 level General Basic Science courses, the courses in the programme being horizontally and vertically integrated and taught in semesters;
2. for the Bachelor of Medicine and Surgery degree, the professional examinations are four that are taken at the conclusion of designated courses which are grouped into Basic Medical Sciences (one professional examination), Basic Clinical Sciences (one professional examination) and Clinical Sciences (two professional examinations);
3. for horizontal integration, as much as possible, system-wide courses are taught concurrently across subjects. For instance, the anatomy of the thorax and abdomen (including histology) is taught at the same level and semester in the curriculum during which respiratory, gastro-intestinal and renal physiology is also taught;
4. for vertical integration, courses overlap into semesters and levels preceding those when their professional examinations are to be held. For instance, pathology and pharmacology which are assessed at the Second Professional Examination at the 400 level, have their teaching commencing at the 300 level when the First Professional Examination for the subjects of Human Anatomy, Human Physiology and Medical Biochemistry is held. In the same vein, teaching in Internal Medicine and Surgery commences at the 400 level when the subjects of Pathology and its branches as well as Pharmacology are examined at the Second Professional Examination. Furthermore, teaching in Community Medicine which is examined in the Fourth and Final Professional Examination at the 600 level, commences at the 200 level with Community Orientation and the subject is taught virtually at all levels up to the last. These actions ensure that the Basic Medical Science, Basic Clinical Science and the Clinical Science courses are integrated, overlap and flow into one another and are not in strict compartments;
5. the curriculum is competency-based and attuned to the needs of society by being strongly community oriented. Teaching is in line with identified learning objectives and the acquisition of practical skills which are in sync with the philosophy of the discipline;
6. prolonged didactic lectures are discouraged while self-learning, learning in small groups and seminars are encouraged. The importance placed on competency and the acquisition of practical skills with less didactic teaching frees up time for self-learning, free weekends, some leisure as well as resits of professional examinations;
7. the curriculum emphasises a satisfactory knowledge base, spirit of teamwork, social and ethical responsibility as well as life-long learning. Emphasis is also placed on digital literacy and the proficient use of modern digital equipment, including computers and other ICT facilities in patient care and data management;
8. acquisition of clinical skills is introduced early, at the 200 level and learning outcomes are clearly defined for each subject that is taught in all parts of the curriculum;
9. related issues in health care consisting of bio-medical ethics, medical jurisprudence, alternative medicine, health care management and administration, and entrepreneurship are taught and examined; and
10. the degree that the curriculum leads to, the Bachelor of Medicine and Bachelor of Surgery remain unclassified. However, the curriculum has been structured on the Course Credit/Grade Point Average System to enhance the subsequent issuance of academic transcripts, inter university transfers, the award of prizes and in conformity with global best practices.

Employability Skills

1. Ability to work long hours in good spirit, often under pressure.
2. Good practical skills for clinical evaluation and emergency management.
3. Effective clinical decision-making.
4. Ability to provide leadership and management skills to a multidisciplinary healthcare team.
5. Good communication skills, compassion, and good bedside manners.
6. Drive to continue learning throughout career.
7. Capacity to apply information technology skills in clinical care settings.

21st Century Skills

1. Collaboration
2. Communication
3. Critical thinking
4. Information literacy
5. Innovation
6. Leadership
7. Life-long learning
8. Problem solving
9. Social skills
10. Technology literacy

Admission and Graduation Requirements

Admission Requirements

Six Year Programme

1. In addition to acceptable scores in the Unified Tertiary Matriculation Examination (UTME), candidates to be admitted into the degree programme shall possess a credit pass in each of the following: Physics, Chemistry, Biology, Mathematics and English language at the Senior Secondary Certificate (SSC) or their equivalents at one sitting.
2. In addition, they will sit for and obtain an acceptable score for the university they wish to be admitted into at the Joint Admission and Matriculation Examination as well as the post UTME.

Five Year Programme

1. Candidates who possess relevant 'A' level passes in Physics, Chemistry and Biology/Zoology.
2. Holders of first degrees in relevant science areas may also be admitted through the direct entry mode.
3. Candidates seeking direct entry into the programme should in addition have credit passes in Physics, Chemistry, Biology, Mathematics and English language at the SSC or their equivalents at one sitting.
4. In addition, they will register for and be admitted through the Joint Admission and Matriculation Board as well as the post UTME and screening of the respective University.

Duration

The programme in Medicine shall be for a minimum of six (6) years consisting of one year of basic sciences, two years of basic medical sciences, one year of basic clinical sciences and two years of clinical sciences. Other than the one year of basic sciences, the periods for the basic medical, basic clinical and clinical sciences courses are not in strict compartments as they overlap slightly during the course of the programme.

Graduation Requirements

1. To graduate from the MBBS/MBChB degree programme**,** a student shall have undergone six (6) or five (5) academic sessions depending on the admission entry mode, Six Year Programme or Five Year Programme.
2. The student must have passed all prescribed professional examinations (from 200 level) with a score of not less than 50% in each course. For the clinical courses, a pass (minimum of 50% score) in the clinical component of each examination is also required. To graduate, a student must be found worthy in character throughout the period of his/her course of study. The student must also submit the report of a supervised research project.
3. The MBBS/MBChB degree shall remain unclassified according to the CGPA but excellence may be recognised through the award of distinctions.

Global Course Structure

The courses leading to the award of MBBS/MBChB degree are the Basic Medical Sciences, the Basic Clinical Sciences and the Clinical Medical Sciences. The programme should produce compassionate, socially responsive, relevant and accountable graduates that meet up with global standards of the attitude, skills and knowledge of the profession required for general clinical practice and further specialist professional and or academic training. The subjects under the various courses are allotted definite time and common courses could be taken along with other students within the College. The students are exposed to clinical medicine early in the programme, integrated with the basic medical sciences. They should not have less than 3 sessions of exposure in clinical medicine which should include internal Medicine (and its specialties and Family Medicine), Surgery (including the surgical specialties), Paediatrics and Child Health, Obstetrics and Gynaecology, Community Medicine, Anaesthesia and Radiology. The methods of instruction and assessment should be integrated, competency-based, community-oriented, self directional learning and person/patient-centred. All courses in this programme are compulsory.

The Basic Medical Science subjects shall include Human Anatomy, Human Physiology and Medical Biochemistry (Levels 200 and 300). The Basic Clinical Sciences subjects shall include Pathology (Microbiology including clinical virology and parasitology, Chemical Pathology, Morbid Anatomy, Haematology/Immunology) and Pharmacology (Levels 300 & 400). The Clinical Sciences subjects shall include Medicine with all its specialties, Surgery with all its specialties, Paediatrics and Child Health, Obstetrics and Gynaecology and Community Medicine. The practical demonstration of medical ethics should be reflected in the teaching and practice of all the subjects.

MBBS Programme Map

<table>
<tr><td colspan="6">Pre-Clinical Phase</td></tr>
<tr><td></td><td></td><td colspan="2">First Semester</td><td colspan="2">Second Semester</td></tr>
<tr><td>Basic Medical Sciences</td><td>200 Level</td><td colspan="2">Human Anatomy I
Human Physiology I
Medical Biochemistry I
Community Orientation/Psychology
CS I
25 Weeks
1000 Contact Hours
Lectures = 34 Credits
Practicals= 11 Credits</td><td colspan="2">Human Anatomy II
Human Physiology II
Medical Biochemistry II
CS II
MDH I

25 Weeks
1000 Contact Hours
Lectures= 34 Credits
Practicals= 11 Credits</td><td>End of Session Vacation

2 Weeks</td></tr>
<tr><td>Basic Medical & Basic Clinical Sciences</td><td>300 Level</td><td>Human Anatomy III
Human Physiology III
Medical Biochemistry III
CS III
MDH II

26 Weeks
1040 Hours
Lectures =36 C
Pract=11 C</td><td>1st Professional MBBS Examination. 2 Weeks</td><td>Community Diagnosis I

4 Weeks
160 hours=4 C

Mid-Semester Vacation/Resit Examination
2 Weeks</td><td>Comm. Medicine II

4 Weeks
80 hours
Lectures= 5 C
Pract=2C</td><td>Pathology I
Pharmacology I

14 Weeks
560 Hours
Lectures=34 C
Pract=2 C</td></tr>
<tr><td colspan="6">Clinical Phase</td></tr>
</table>

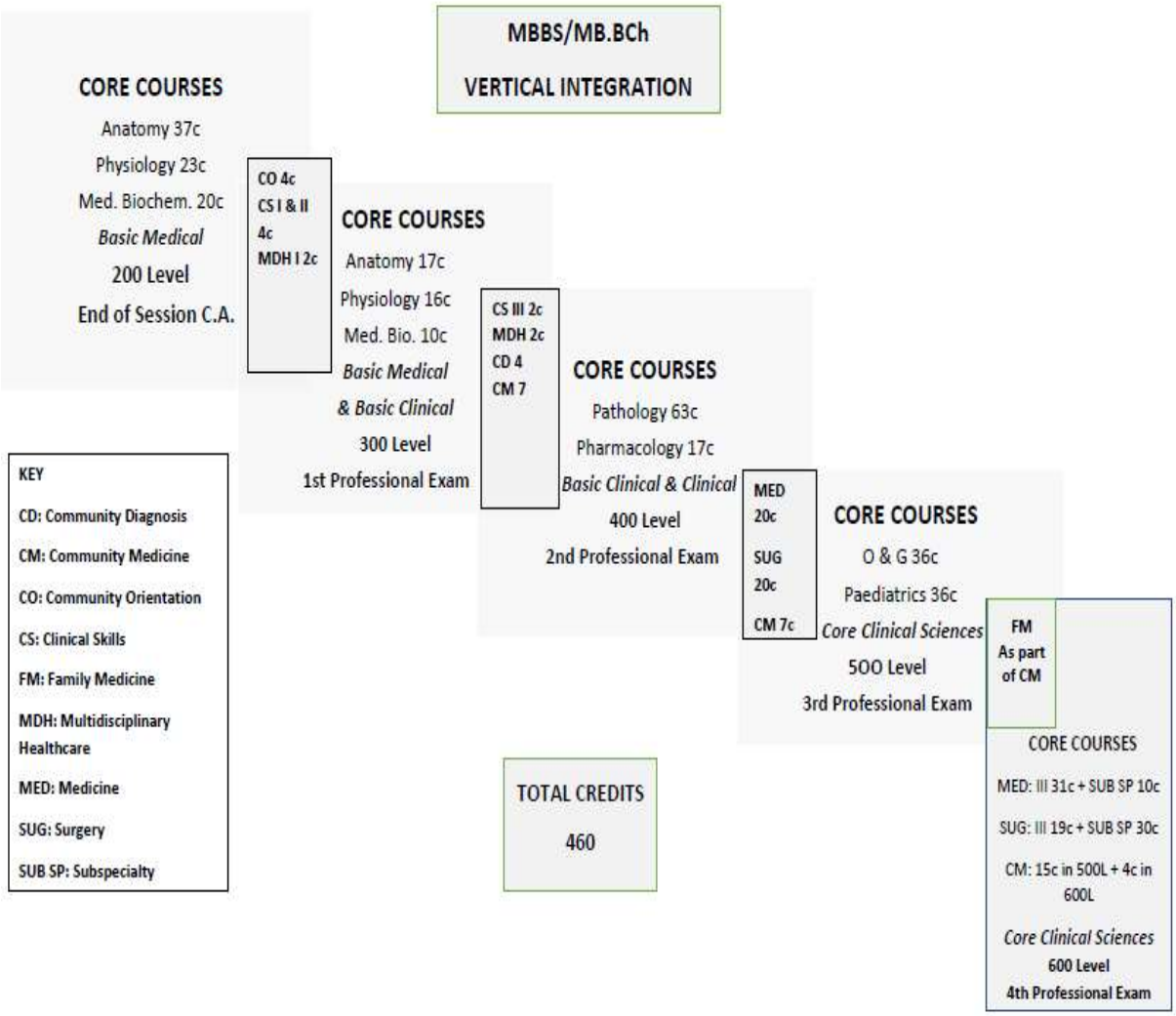
Basic Clinical & Clinical Sciences	400 Level	Pathology II Pharmacology II **16 Weeks** 800 Hours Lectures =40c Practical =4 c	Medicine I Surgery I **12 Weeks** 480 Hours Lecture=12c Clinical= 7c	Com. Med III **4 Weeks** 80 Hours Lect=5c Pract=2c	Medicine II Surgery II **12 Weeks** 480 Hours Lecture =12c Clinical =7c	2nd Professional Exam. **2 Weeks**	Resit Revision 2 Weeks Resit Exam 2 Weeks End of Session Vacation 2 Weeks
Clinical Sciences	500 Level	O & G I Paediatrics I **20 Weeks** 840 Hours Lect/Tut =25c Clinical= 11c	Com. Med IV **4 Weeks** 160 Hours Lect = 6c Pract=4c	O & G II Paediatrics II **20 Weeks** 840 Hours Lect/Tut=25 c Clin= 11c	3rd Professional Exam. **2 Weeks**	Resit Revision **2 Weeks** Resit Examination **2 Weeks** Research Project in Com. Medicine (4 Weeks)	End of Session Vacation. **2 Weeks**
	600 Level	**Subspecialty Postings** Dermatology (2 Weeks) ENT (2 Weeks) Radiology (4 Weeks) Orthopaedics (4 Weeks) Anaesthesia & Critical Care (4 Weeks) Ophthalmology (4 Weeks) Psychiatry (4 Weeks) **24 Weeks** 2 Weeks Posting= 2c Lect & 1c Clinical 4 Weeks Postings=4c Lect & 2c Clinical			Medicine III Surgery III **24 Weeks** Lectures= 20c Clinical Teach= 15c	Revision: CM. MED & SUG **2 Weeks** Total 7c: CM. 4c, MED **4th Professional** 4th Professional Examination **2 Weeks**	

MBBS Programme with Credit Weights

	Pre-Clinical					
	Course	1st Sem 200L	2nd Sem 200L	1st Sem 300L	Total	
1a	Human Anatomy Lectures	8	8	8	24	
1b	Gross Dissection	5	5	5	15	
1c	Histology	3	3	2	8	
1d	Embrology	2	3	2	7	
2a	Human Physiology Lectures	9	10	13	32	
2b	Physiology Practical	2	2	3	7	
3a	Medical Biochemistry Lectures	8	8	8	24	
3b	Medical Biochemistry Practicals	2	2	2	6	
	Sub-Total	39	41	43	123	
4	Community Orientation and Psychology	4	-	-	Credits added to CM	See serial 15 below
5	Clinical Skills (I, II & III)	2	2	2	Credits added to MED & SUG	See serial 13 below
5	MDH (I&II)		2	2	Credits added to CM	See serial 15 below
	Total For Semesters	45	45	47	137	
	Basic Clinical					
	Pathology	I 2nd Sem 300L	II 1st Sem 400L	TOTAL		
4	Morbid Anatomy	9	9	18		
5	Microbiology	8	9	17		
6	Chemical Pathology	6	10	16		
7	Haematology/ Immunology	4	8	12	63	
8	Pharmacology	9	8	17		
	Total	36	44	80	80	

Clinical							
	Course	I 1st Sem 500L	II 2nd Sem 500L	Total			
9	Paediatrics	18	18	36			
10	Obstetrics & Gynaecology	18	18	36			
				72			
		MED & SUG I 1st Sem 400L	MED & SUG II 2nd Sem 400L	Subspecialties 1st Sem 600L	MED & SUG III 2nd Sem 600L	L 2&3 CS I, II & III	Total
13	Medicine & Subspecialties (Dermatology & Psychiatry)	10	10	10	27	3	60
14	Surgery & Subspecialties (ENT, Anaesthesia, Radiology, Ophthalmology & Orthopaedics)	10	10	24	19	3	66
		I 200L	II 2nd Sem	III 400L	IV 500L	V 600L	Total
15	Community Medicine (Including Community Orientation, Community Diagnosis, MDH	7	11	7	14	2	41
Grand total Units for the Programme					**460**		

Integrated Curriculum Map



100 Level

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 111	Communication in English	2	C	15	45
GST 112	Nigerian Peoples and Culture	2	C	30	-
MTH 101	Elementary Mathematics I	2	C	30	-
MTH 102	Elementary Mathematics II	2	C	30	-
BIO 101	General Biology I	2	C	30	-
BIO 102	General Biology II	2	C	30	-
BIO 107	General Biology Practical I	1	C	-	45
BIO 108	General Biology Practical II	1	C	-	45
CHM 101	General Chemistry I	2	C	30	-
CHM 102	General Chemistry II	2	C	30	-
CHM 107	General Practical Chemistry I	1	C	-	45
CHM 108	General Practical Chemistry II	1	C	-	45

PHY 101	General Physics I	2	C	30	-
PHY 102	General Physics II	2	C	30	-
PHY 107	General Physics Practical I	1	C	-	45
PHY 108	General Physics Practical II	1	C	-	45
	Total	**26**			

Courses leading to First Professional MBBS/MBChB Examination

200 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
ENT 211	Entrepreneurship and Innovation	2	C	15	45
ANA 201a	Intro. H Anatomy and Gross Anatomy of Upper Limbs	4	C	60	-
ANA 201b	Intro. H Anatomy and Gross Anatomy of Lower Limbs	4	C	60	-
ANA 203	Histology of Basic Tissues	2	C	30	-
ANA 205	General Embryology	2	C	30	-
ANA 207	Practical Work	5	C	-	225
PHS 201	Introductory Physiology and the Autonomic Nervous System	2	C	30	-
PHS 203	Blood physiology	2	C	30	-
PHS 205	The Cardiovascular system	2	C	30	-
PHS 207	Physiology Practical I	2	C	-	90
BCH 201	Cell Biology, PH and Buffer	2	C	30	-
BCH 203	Carbohydrate Chemistry	2	C	30	-
BCH 205	Amino Acids chemistry	2	C	30	-
BCH 207	Biochemistry Practical I	2	C	-	90
BCH 209	Lipid Metabolism	2	C	30	-
CSS 201	Clinical Skills I	2	C	-	90
	Total	**39**			

Community Orientation/Psychology

200 Level First Semester

Course Code	Course Title	Unit	Status	LH	PH
COM 201	Introduction to Medical Sociology	1	C	15	-
COM 203	Man and His Environment	1	C	15	-
COM 205	Introduction to Medical Psychology	1	C	15	-
MDH 201	History of Medicine	1	C	15	-
MDH 203	Evolution of Medical Education in Nigeria	1	C	15	-
	Total	**5**			

200 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 212	Philosophy, Logic and Human Existence	2	C	30	-
ANA 202a	Gross Anatomy of Thorax, Abdomen	4	C	60	-
ANA 202b	Gross Anatomy of Pelvis and Perineum	4	C	60	-
ANA 204	Systemic Histology (Organology)	3	C	45	-
ANA 206	Systemic Embryology (Organogenesis)	3	C	45	-
ANA 208	Practical Work	5	C	-	225
PHS 202	Renal Physiology, Body Fluids and Temperature Regulation	4	C	60	-
PHS 204	Respiratory system	3	C	45	-
PHS 206	Neuroscience I	3	C	45	-
PHS 208	Physiology Practical II	2	C	-	90
BCH 202	Nucleic Acids Chemistry	2	C	30	-
BCH 204	Enzymes, Coenzymes and Bioenergetics	2	C	30	-
BCH 206	Amino Acids Metabolism	2	C	30	-
BCH 208	Carbohydrate Metabolism	2	C	30	-
BCH 210	Biochemistry Practical II	2	C	-	90
MDH 202	Multidisciplinary Healthcare I	2	C	-	90
MDH 204	Computers in Medicine	1	C	-	45
CSS 202	Clinical Skills II	2	C	-	90
	Total	**48**			

300 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
ANA 301	Gross Anatomy of Head and Neck and Neuroanatomy	4	C	60	-
ANA 303	Histology of special senses and Neuro-histology/Histo-chemistry	2	C	30	-
ANA 305	Neuro-embryology and development of Pharyngeal Apparatus	2	C	30	-
ANA 307	Human Genetics	2	C	30	-
ANA 309	Laboratory Techniques for Light Microscopy/Gross Radiologic Techniques	2	C	-	90
ANA 311	Practical Work	3	C	-	135
PHS 301	Gastrointestinal Physiology	2	C	30	-
PHS 303	Endocrinology and Reproduction	3	C	45	-
PHS 305	Pathophysiology I	3	C	45	-
PHS 307	Laboratory Teaching and Instrumentation	3	C	45	-

PHS 309	Neuroendocrinology	2	C	30	-
PHS 311	Pathophysiology II	2	C	-	90
BCH 301	Metabolism of Nucleic Acid and Protein Synthesis	2	C	30	-
BCH 303	Integration of Metabolism	1	C	15	-
BCH 305	Nutrition	2	C	15	45
BCH 307	Biochemical Genetics and Molecular Biology	2	C	30	-
BCH 309	Special Topics	2	C	30	-
MDH 301	Multidisciplinary Healthcare II	2	C	-	90
CSS 301	Clinical Skills III	2	C	-	90
	Total	**43**			

Courses leading to Second Professional MBBS/MBChB Examination

300 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 312	Peace and Conflict Resolution	2	C	30	-
ENT 312	Venture Creation	2	C	15	45
PAT 302	General Pathology I	4	C	60	-
PAT 304	General Pathology II	4	C	60	-
PAT 306	Pathology Practical I	1	C		45
PCL 302	Introductory Pharmacology	3	C	45	-
PCL 304	Autonomic Pharmacology	3	C	45	-
PCL 306	Cardiovascular Pharmacology	3	C	30	45
MIC 302	Introductory Microbiology and General Bacteriology	2	C	15	45
MIC 304	General Parasitology	2	C	30	-
MIC 306	General Virology	2	C	30	-
MIC 308	General Mycology	2	C	15	45
CPY 302	Introduction to Chemical Pathology	3	C	30	45
CPY 304	Immunology	1	C	15	-
CPY 306	Clinical Chemistry of Disease I	2	C	15	45
HEM 302	General Haematology I: Introductory Haematology	4	C	30	90
	Total	**40**			

Community Medicine and Diagnosis

300 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
COM 302	Introduction to Demography and Vital	2	C	30	-
COM 304	Introduction to Environmental Health	2	C	30	-
COM 306	Introduction to Occupational Health	1	C	15	-

COM 308	Introduction to General Epidemiology	2	C	30	-
COM 310	Community Diagnosis and Research Methods	2	C	30	-
COM 312	Field Posting (Community Diagnosis)	2	C	-	90
	Total	**11**			

400 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
PAT 401	Systemic Pathology I	3	C	45	-
PAT 403	Pathology Practical II	2	C		90
PCL 401	GIT Pharmacology	1	C	15	-
PCL 403	Respiratory Pharmacology	1	C	15	-
PCL 405	Clinical Pharmacology and Therapeutics	2	C	30	-
HEM 401	General Haematology II: Anaemias	2	C	15	45
HEM 403	Haemato-Oncology and Bleeding Disorders	2	C	30	-
MIC 401	Medical Bacteriology	1	C	15	-
MIC 403	Medical Mycology	1	C	15	-
MIC 405	Medical Parasitology	1	C	15	-
MIC 407	Applied Medical Microbiology	1	C	15	-
CPY 401	Clinical Chemistry of Disease II	3	C	30	45
CPY 403	Analytical Procedures and Practicals	2	C	-	90
	Total	**22**			

Community Medicine and Primary Health Care Posting

400 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
COM 401	Introduction to Primary Health Care	1	C	15	-
COM 403	Health Education and Health Advocacy	1	C	15	-
COM 405	Public Health Nutrition and Rehabilitation	1	C	15	-
COM 407	Maternal/Child Health and Reproductive Health	1	C	15	-
COM 409	Immunity and Immunization Programme	1	C	15	-
COM 411	PHC Posting/Rural Health Posting	2	C	-	90
	Total	**7**			

Medicine Courses leading to Fourth Professional MBBS/MBChB Examination

Community Medicine and Primary Health Care Posting

400 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
MED 401	Introduction to Clinical Medicine I	2	C	30	-
MED 403	Introduction to Clinical Medicine II	2	C	30	-
MED 405	Cardiology I	2	C	30	-
MED 407	Nephrology I	2	C	30	-
MED 409	Clinics, Call Duty and Bed Side Teaching I	12	C	-	540
	Total	**20**			

Surgery Courses leading to Fourth Professional MBBS/MBChB Examination

400 level first semester

Course Code	Course Title	Units	Status	LH	PH
SUG 401	General Surgery I	5	C	75	-
SUG 403	Paediatric Surgery	2	C	30	-
SUG 405	Clinics, Theatre and Call Duty Bed Side Teaching I	13	C	-	585
	Total	**20**			

400 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
PAT 402	Systemic Pathology II	3	C	30	45
PAT 404	Forensic Pathology	1	C	15	-
PCL 402	Clinical Toxicology	1	C	15	-
PCL 404	Central Nervous System Pharmacology	1	C	15	-
PCL 406	Endocrine Pharmacology	1	C	15	-
PCL 408	Chemotherapy	1	C	15	-
MIC 402	Medical Virology	1	C	15	-
MIC 404	Medical Entomology	1	C	15	-
MIC 406	Medical Protozoology	1	C	15	-
MIC 408	Medical Helminthology	1	C	15	-
MIC 410	Microbial Genetics	1	C	15	-
CPY 402	Clinical Nutrition and Nutritional Support	3	C	30	45
CPY 404	Clinical Enzymology	2	C	30	-
HEM 402	Blood Transfusion and Transplantation	2	C	15	45

HEM 404	Practical and Interpretative Haematology	2	C	-	90
	Total	**22**			

Medicine Courses leading to Fourth Professional MBBS/MBChB Examination

400 Level Second Semester

Course Code	Course Title	Units	Status	LH	PH
MED 402	Respiratory Medicine I	2	C	30	-
MED 404	Gastroenterology	2	C	30	-
MED 406	Infectious Diseases	2	C	30	-
MED 408	Neurology 1	2	C	30	-
MED 410	Clinics, Call Duty and Bed Side Teaching II	12	C	-	540
	Total	**20**			

Surgery Courses leading to Fourth Professional MBBS/MBChB Examination

400 Level Second Semester

Course Code	Course Title	Units	Status	LH	PH
SUG 402	General Surgery II	5	C	75	-
SUG 404	Urology	2	C	30	-
SUG 406	Clinics, Theatre and Call Duty Bed Side Teaching II	13	C	-	585
	Total	**20**			

Courses leading to Third Professional MBBS/MBChB Examination

500 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
OBG 501	General Gynaecology	3	C	45	-
OBG 503	Antenatal Care/Foetal Medicine	2	C	30	-
OBG 505	Gynaecological and Obstetric Emergencies	2	C	30	-
OBG 507	Gynaecological Clinic/Simulation Training	2	C	-	90
OBG 509	Labour and its Complications, Operative Obstetrics, Newborn Baby Puerperium and its Abnormalities, Safe Motherhood	3	C	45	-
OBG 511	Clinics, Theatre and Call Duty Bed Side Teaching I	6	C	15	225
PAE 501	Introduction to Paediatrics and Child Health	2	C	30	-
PAE 503	Cardiovascular and Respiratory Disorders	2	C	30	-

PAE 505	Gastrointestinal and genitourinary system	2	C	30	-
PAE 507	Endocrine and Metabolic	2	C	30	-
PAE 509	Neonatology and Genetics	2	C	15	45
PAE 511	Specific Infectious Diseases	2	C	30	-
PAE 513	Clinics, Call Duty and Bed Side Teaching I	5	C	15	180
	Total	**35**			

Community Medicine and Primary Health Care Posting

500 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
COM 501	Epidemiology/Principles of Control of Communicable Diseases/Epidemic Diseases of Global Importance	2	C	30	-
COM 503	Epidemiology/Principles of Control of Non-Communicable Diseases. Chronic Diseases and Cancers of Global Importance	2	C	30	-
COM 505	Global Health and Role of Non-Governmental Health Organisations (NGOs)	1	C	15	-
COM 507	Health Research Ethics and Ethics of Good Medical Practices: Role of Medical and Dental Council of Nigeria (MDCN)	1	C	15	-
COM 509	Environmental and Occupational Health Practices and Role of Medical Officer of Health	2	C	30	-
COM 511	Descriptive and Inferential Statistics	1	C	15	-
COM 513	Public Health Administration and Management, National Health Policy, Healthcare Financing and Health System	2	C	30	-
COM 515	Community Health Project and the Role of Laboratory in Community Health Field Practice and Urban Community Health Field Posting	4	C	15	135
	Total	**15**			

Family Medicine Courses leading to Fourth Professional MBBS/MBChB Examination

500 Level First Semester

Course Code	Course Titles	Unit	Status	LH	PH
FAM 501	Family Structure and Role in Health	1	C	15	-
FAM 503	Private Practice Organisation	1	C	15	-
FAM 505	Private Practice Organisation/Ethics of Medical Practice	1	C	15	-
	Total	**3**			

500 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
OBG 502	Reproductive Health and Family Planning	2	C	30	-
OBG 504	Obstetric Clinic/Simulation Training	2	C	15	45
OBG 506	Gynaecological Oncology	1	C	15	-
OBG 508	Medical Disorders in Pregnancy	2	C	30	-
OBG 510	Urogynaecology	1	C	15	-
OBG 512	Complications in Pregnancy	2	C	30	-
OBG 514	Reproductive Endocrinology and Fertility	2	C	30	-
OBG 516	Clinics, Theatre and Call Duty Bed Side Teaching II	6	C	15	225
OBG 518	Gynaecological Endoscopy	2	C	30	-
PAE 502	Nutrition, Growth and Development	3	C	15	90
PAE 504	Child Health and Primary Care	3	C	30	45
PAE 506	Paediatric Oncology	2	C	30	-
PAE 508	Diseases of the CNS, Muscles and Bones	2	C	30	-
PAE 510	Diseases of the Blood	2	C	30	-
PAE 512	Clinics, Call Duty and Bed Side Teaching II	5	C	15	180
	Total	**37**			

Courses leading to Fourth Professional MBBS/MBChB Examination

600 Level First Semester Ultra-Short Postings (Dermatology, ORL and Radiology)

Course Code	Course Title	Unit(s)	Status	LH	PH
DER 601	Dermatology Lectures	3	C	45	-
DER 603	Dermatology Clinic	1	C	-	45
ORL 601	ORL lectures	3	C	45	-

ORL 603	ORL Clinic, Theatre, and Ward Round Teaching	1	C	-	45
RAD 601	Radiology Lectures	3	C	45	-
RAD 603	Radiology Procedures and Result Interpretation	1	C	-	45
	Total	**12**			

Short Postings (Orthopaedics, Anaesthesia, Psychiatry and Ophthalmology)

600 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
ORT 601	Principles of Orthopaedic Surgery	4	C	60	-
ORT 603	Clinics, Theatre and Bed Side Teaching in Orthopaedics	3	C	-	135
ORT 605	Tutorials in Orthopaedics	2	C	-	90
OPT 601	Introductory Ophthalmology	2	C	30	-
OPT 603	Cornea, External Eye Diseases, Lacrimal System, Orbit	1	C	15	-
OPT 605	Lens and Cataract	1	C	15	-
OPT 607	Neuro-Ophthalmology Glaucoma	2	C	30	-
OPT 609	Paediatric Ophthalmology	1	C	15	-
OPT611	Ocular Manifestations of Systemic Diseases	1	C	15	-
OPT 613	Refractive Errors	1	C	15	-
OPT 615	Community Ophthalmology	1	C	15	-
ANE 601	Anaesthesia lectures	3	C	45	-
ANE 603	Clinical Skills Simulation, ICU and Theatre Teaching	3	C	-	135
PSY 601	General Psychiatry	3	C	45	-
PSY 603	Subspecialty Psychiatry	2	C	30	-
PSY 605	Tutorial and Seminar in Psychiatry	1	C	15	-
PSY 607	Psychiatry Clinic	2	C	-	90
	Total	**33**			

Surgery Courses leading to Fourth Professional MBBS/MBChB Examination

600 Level Second Semester

Course Code	Course Title	Units	Status	LH	PH
SUG 601	Plastic Surgery and Burns	2	C	30	-
SUG 603	Cardiothoracic Including Vascular	2	C	30	-
SUG 605	Neurosurgery	2	C	30	-
SUG 607	Special Topics in Surgery	2	C	30	-
SUG 609	Clinics, Theatre and Call Duty Bed Side teaching	15	C	-	675

	Total	**23**			

Medicine Courses leading to Fourth Professional MBBS/MBChB Examination

600 Level Second Semester

Course Code	Course Title	Units	Status	LH	PH
MED 602	Metabolic and Endocrine Medicine	2	C	30	-
MED 604	Neurology II	2	C	30	-
MED 606	Cardiology II	2	C	30	-
MED 608	Gastroenterology II	2	C	30	-
MED 610	Rheumatology /Care of the Elderly	2	C	30	-
MED 612	Haematology II	2	C	30	-
MED 614	Infectious diseases II	2	C	30	-
MED 616	Nephrology II	2	C	30	-
MED 618	Pulmonology II	2	C	30	-
MED 620	Clinics, Call Duty and Bed Side Teaching	13	C	-	585
	Total	**31**			

Course Contents and Learning Outcomes

100 Level

GST 111: Communication in English (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. identify possible sound patterns in English language;
2. list notable language skills;
3. classify word formation processes;
4. construct simple and fairly complex sentences in English;
5. apply logical and critical reasoning skills for meaningful presentations;
6. demonstrate an appreciable level of the art of public speaking and listening; and
7. write simple and technical reports.

Course Contents

Sound patterns in English language (phonetics and phonology, vowels and consonants). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Sentence in English (types, structural and functional, simple and complex). Grammar and usage (tense, mood, modality, concord and aspects of language use in everyday life). Logical and critical thinking and reasoning methods (logic and syllogism, inductive and deductive argument and reasoning methods, analogy, generalisation and explanations). Ethical considerations, copyright rules and infringements. Writing activities (Pre-writing, writing, post writing/editing and proofreading, paragraphing, types of writing, summary, essays, letters, curriculum vitae, report writing, note making and mechanics of writing). Comprehension strategies (reading and types of reading, comprehension skills, 3RsQ).

Information and communication technology in modern language learning. Language skills for effective communication. Major word formation processes. Writing and reading comprehension strategies. Logical and critical reasoning for meaningful presentations. Art of public speaking and listening.

GST 112: Nigerian Peoples and Culture (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. analyse the historical foundation of the Nigerian culture and arts in pre-colonial times;
3. list and identify the major linguistic groups in Nigeria;
4. explain the gradual evolution of Nigeria as a political unit;
5. analyse the concepts of trade, economic and self-reliance status of the Nigerian people towards national development;
6. enumerate the challenges of the Nigerian State towards nation building;
7. analyse the role of the judiciary in upholding people's fundamental rights;
8. identify acceptable norms and values of the major ethnic groups in Nigeria; and
9. list and suggest possible solutions to identifiable Nigerian environmental, moral and value problems.

Course Contents

Nigerian history, culture, and art up to 1800 (Yoruba, Hausa and Igbo peoples and culture; peoples and culture of the ethnic minority groups). Nigeria under colonial rule (advent of colonial rule in Nigeria, Colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914, formation of political parties in Nigeria, nationalist movement and struggle for independence). Nigeria and challenges of nation building (military intervention in Nigerian politics and Nigerian Civil War). Concept of trade and economics of self-reliance (indigenous trade and market system, indigenous apprenticeship system among Nigeria people, trade, skill acquisition and self-reliance). Social justices and national development (law, definition and classification). Judiciary and fundamental rights. Individual norms and values (basic Nigeria norms and values, patterns of citizenship acquisition, citizenship and civic responsibilities, indigenous languages, usage and development, negative attitudes and conducts. Cultism, kidnapping and other related social vices). Re-orientation, moral and national values (The 3R's, reconstruction, rehabilitation and re-orientation). Re-orientation strategies, Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAI), War Against Indiscipline and Corruption (WAIC), Mass Mobilization for Self-Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

MTH 101: Elementary Mathematics I (Algebra and Trigonometry) (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. explain basic definition of set, subsets, union, intersection, complements and use of Venn diagrams;
2. solve quadratic equations;
3. solve trigonometric functions;
4. identify various types of numbers; and
5. solve some problems using binomial theorem.

Course Contents
Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers, integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers, algebra of complex numbers, the Argand diagram. De-Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH 102: Elementary Mathematics II (Calculus) (2 Units C: LH 30)

Learning Outcomes
At the end of the course, students should be able to:
1. identify types of rules in differentiation and integration;
2. describe the meaning of function of a real variable, graphs, limits and continuity; and
3. solve some applications of definite integrals in areas and volumes.

Course Contents
Function of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation. Extreme curve sketching, integration as an inverse of differentiation. Methods of integration and definite integrals. Application to areas and volumes.

BIO 101: General Biology I (2 Units C: LH 30)

Learning Outcomes
At the end of lectures in Plant Biology, students should be able to:
1. explain cells structure and organizations;
2. summarise functions of cellular organelles;
3. characterise living organisms and state their general reproduction;
4. describe the interrelationship that exists between organisms;
5. discuss the concept of heredity and evolution; and
6. enumerate habitat types and their characteristics.

Course Contents
Cell structure and organisation. Functions of cellular organelles. Characteristics and classification of living things. Chromosomes, genes their relationships and importance. General reproduction. Interrelationships of organisms (competitions, parasitism, predation, symbiosis, commensalisms, mutualism, saprophytism). Heredity and evolution (introduction to Darwinism and Lamarkism, Mendelian laws, explanation of key genetic terms). Elements of ecology and types of habitat.

BIO 102: General Biology II (2 Units C: LH 30)

Learning Outcomes
At the end of the lectures, students should be able to:
1. list the characteristics, methods of identification and classification of viruses, bacteria and fungi;
2. state the unique characteristics of plant and animal kingdoms;
3. describe ecological adaptations in the plant and animal kingdoms;
4. explain nutrition, respiration, excretion and reproduction in plants and animals; and
5. describe growth and development in plants and animals.

Course Contents
Basic characteristics, identification and classification of viruses, bacteria and fungi.
A generalized survey of the plant and animal kingdoms based mainly on the study of similarities and differences in the external features. Ecological adaptations. Briefs on physiology to include nutrition, respiration, circulatory systems, excretion, reproduction, growth and development.

BIO 107: General Biology Practical I (1 Unit C: PH 45)

Learning Outcomes
At the end of the course, students should be able to:
1. outline common laboratory hazards;
2. identify precautions on laboratory hazards;
3. state the functions of the different parts of microscope;
4. use the microscope and describe its maintenance;
5. draw biological diagrams and illustrations; and
6. apply scaling and proportion to biological diagrams.

Course Contents
Common laboratory hazards. Prevention and first aid. Measurements in biology. Uses and care of microscope. Compound and dissecting microscope. Biological drawings and illustration, scaling, accuracy and proportion. Use of common laboratory apparatus and laboratory experiments designed to illustrate the topics covered in BIO 101.

BIO 108: General Biology Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of the course, students should be able to:
1. describe the anatomy of flowering plants;
2. differentiate types of fruit and seeds;
3. state ways of handling and caring for biological wares;
4. describe the basic histology of animal tissues; and
5. identify various groups in the animal kingdom.

Course Contents
Anatomy of flowering plants, primary vegetative body, stem, leaf and root to show the mature tissues namely parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Care and use of dissecting kits and other biological wares. Dissection and general histology of animal tissues based on vertebrate forms. Morphology and functions of epithelial, muscular, nervous and connective tissues. Examination of various groups of lower invertebrates under microscopes, identification of various groups of organisms in animal kingdom. Any experiment designed to emphasise the practical aspects of topics in BIO 102.

CHM 101: General Chemistry I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define atom, molecules and chemical reactions;
2. discuss the modern electronic theory of atoms;
3. write electronic configurations of elements on the periodic table;
4. justify the trends of atomic radii, ionisation energies, electronegativity of the elements based on their position in the periodic table;

5. identify and balance oxidation – reduction equation and solve redox titration problems;
6. illustrate shapes of simple molecules and hybridised orbitals;
7. identify the characteristics of acids, bases and salts and solve problems based on their quantitative relationship;
8. apply the principles of equilibrium to aqueous systems using LeChatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
9. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
10. determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents
Atoms, molecules, elements, compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridization and shapes of simple molecules. Valence forces and structure of solids. Chemical equations and stoichiometry, chemical bonding and intermolecular forces and kinetic theory of matter. Elementary thermochemistry, rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: General Chemistry II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. state the importance and development of organic chemistry;
2. define fullerenes and its applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. describe rules guiding nomenclature and functional group classes of organic chemistry;
6. determine rate of reaction to predict mechanisms of reaction;
7. identify classes of organic functional group with brief description of their chemistry;
8. discuss comparative chemistry of group 1A, IIA and IVA elements; and
9. describe basic properties of transition metals.

Course Contents
Historical survey of the development and importance of organic chemistry, fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures and nano chemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids and derivatives. The chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 107: General Chemistry Practical I (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out chemical experiment;
3. identify the basic glassware and equipment in the laboratory;

4. tell the differences between primary and secondary standards;
5. perform redox titration;
6. record observations and measurements in the laboratory notebooks; and
7. analyse data to arrive at scientific conclusions.

Course Contents
Laboratory experiments designed to reflect topics presented in courses CHM 101 and CHM 102. These include acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

CHM 108: General Chemistry Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, the students should be able to:
1. identify the general laboratory rules and safety procedures;
2. collect scientific data and correctly carry out chemical experiments;
3. identify the basic glassware and equipment in the laboratory;
4. identify and carry out preliminary tests which includes ignition, boiling point, melting point, test on known and unknown organic compounds;
5. execute solubility tests on known and unknown organic compounds;
6. execute elemental tests on known and unknown compounds; and
7. conduct functional group/confirmatory test on known and unknown compounds which could be acidic/basic/neutral organic compounds.

Course Contents
Continuation of CHM 107. Additional laboratory experiments to include functional group analysis, quantitative analysis using volumetric methods.

PHY 101: General Physics I (Mechanics) (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify and deduce the physical quantities and their units;
2. differentiate between vectors and scalars;
3. describe and evaluate motion of systems on the basis of the fundamental laws of mechanics;
4. apply Newton's laws to describe and solve simple problems of motion;
5. evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;
6. explain and apply the principles of conservation of energy, linear and angular momentum;
7. describe the laws governing motion under gravity; and
8. explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents
Space and time, units and dimension, vectors and scalars, differentiation of vectors, displacement, velocity and acceleration, kinematics, Newton laws of motion (Inertial frames, Impulse, force and action at a distance and momentum conservation). Relative motion, application of Newtonian mechanics, equations of motion, conservation principles in physics, conservative forces, conservation of linear momentum, kinetic energy and work, potential energy, system of particles, centre of mass, rotational motion, torque, vector product, moment, rotation of coordinate axes and angular momentum. Polar coordinates, conservation

of angular momentum, circular motion, moments of inertia, gyroscopes and precession. Gravitation, Newton's Law of gravitation, Kepler's Laws of planetary motion, gravitational potential energy, escape velocity, satellites motion and orbits.

PHY 102: General Physics II (Electricity and Magnetism) (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the electric field and potential and related concepts, for stationary charges;
2. calculate electrostatic properties of simple charge distribution using Coulomb's law, Gauss's law and electric potential;
3. describe and determine the magnetic field for steady and moving charges;
4. determine the magnetic properties of simple current distributions using Biot-Savart and Ampere's law;
5. describe electromagnetic induction and related concepts and make calculations using Faraday and Lenz's laws;
6. explain the basic physical of Maxwell's equations in integral form;
7. evaluate DC circuits to determine the electrical parameters; and
8. determine the characteristics of AC voltages and currents in resistors, capacitors and inductors.

Course Contents

Forces in nature. Electrostatics. Electric charge and its properties. Methods of charging. Coulomb's law and superposition. Electric field and potential. Gauss's law. Capacitance. Electric dipoles. Energy in electric fields. Conductors and insulators. Current, voltage and resistance. Ohm's law and analysis of DC circuits. Magnetic fields. Lorentz force. Biot-Savart and Ampère's laws. Magnetic dipoles. Dielectrics, energy in magnetic fields. Electromotive force. Electromagnetic induction. Self and mutual inductances. Faraday and Lenz's laws. Step up and step down transformers. Maxwell's equations. Electromagnetic oscillations and waves. AC voltages and currents applied to inductors. Capacitors, resistance and combinations.

PHY 107: General Practical Physics I (1 Unit C: PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs; and
5. draw conclusions from numerical and graphical analysis of data.

Course Contents

This introductory course emphasises quantitative measurements, the treatment of measurement errors and graphical analysis. A variety of experimental techniques should be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, covered in PHY 101. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

PHY 108: General Practical Physics II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs;
5. draw conclusions from numerical and graphical analysis of data; and
6. prepare and present practical reports.

Course Contents
This introductory course emphasises quantitative measurements, the treatment of measurement errors and graphical analysis. A variety of experimental techniques should be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, covered in PHY 102. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

200 Level

ENT 211: Entrepreneurship and Innovation (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation, and risk taking;
2. state the characteristics of an entrepreneur;
3. analyse the importance of micro and small businesses in wealth creation, employment and financial independence;
4. engage in entrepreneurial thinking;
5. identify key elements in innovation;
6. describe stages in enterprise formation, partnership and networking including business planning;
7. describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world; and
8. state the basic principles of e-commerce.

Course Contents
Concept of entrepreneurship (entrepreneurship, intrapreneurship/corporate entrepreneurship). Theories, rationale and relevance of entrepreneurship (schumpeterian and other perspectives, risk-taking, necessity and opportunity-based entrepreneurship and creative destruction). Characteristics of entrepreneurs (opportunity seeker, risk taker, natural and nurtured, problem solver and change agent, innovator and creative thinker). Entrepreneurial thinking (critical thinking, reflective thinking, and creative thinking). Innovation (concept of innovation, dimensions of innovation, change and innovation, knowledge and innovation). Enterprise formation, partnership and networking (basics of business plan, forms of business ownership, business registration and forming alliances and joint ventures). Contemporary entrepreneurship issues (knowledge, skills and technology, intellectual property, virtual office, networking). Entrepreneurship in Nigeria (biography of inspirational entrepreneurs, youth and women entrepreneurship, entrepreneurship support

institutions, youth enterprise networks and environmental and cultural barriers to entrepreneurship). Basic principles of e-commerce.

ANA 201a: Introductory Anatomy, Gross Anatomy of Upper Limbs (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. classify the basic divisions of anatomy into regional, systemic and applied anatomy;
2. demonstrate knowledge of anatomical terms, anatomical positions, planes, relationships and comparisons, laterality and movement;
3. identify the shape, two ends, bony markings, and relations of surfaces of the clavicle;
4. categorise the articular surfaces, types, capsules, ligaments and neurovascular supply to the SC and AC joints;
5. identify the articular surfaces, shaft and bony markings of the Humerus;
6. classify the articular surfaces, type, joint capsule, extrinsic and extrinsic ligaments and neurovascular supply to the shoulder joint;
7. describe the ends, articular surfaces, shafts, bony markings and processes of the two forearm bones;
8. describe the articular surfaces, type, capsule, ligaments, range of movement;
9. describe the neurovascular supply of the elbow joint;
10. describe the attachment and orientation of the fibers of the interosseous membrane;
11. enumerate the names, relations and articulations of the two rows of carpal bones;
12. classify the shapes, bases and heads of metatarsals and their articulations;
13. discuss the attachments, actions and innervations of the axioappendicular and scapulohumeral muscles;
14. identify the shape, boundaries and contents of the axilla;
15. differentiate the boundaries and contents of carpal tunnel; and
16. identify the number and compartments of hand muscles and describe the neurovascular bundle of the hand.

Course Contents

Descriptive terms. Plans and terms of relationship of the human body. Terms of comparison. Attachment of muscles. Types of muscles. Movements of joints. Osteology. Principles of Kinesiology. General organisation of body systems. Upper limb. Pectoral region and mammary gland. Axilla and brachial plexus. Deltoid and scapular regions. Arm, forearm, hand, bones and joints.

ANA 201b: Intro. H Anatomy and Gross Anatomy of Lower Limbs (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. identify the three parts of the pelvic bone and their markings and processes;
2. describe the ends, shaft and bony markings and processes of femur;
3. classify the articular surfaces, type, capsule, ligaments, movements, neurovascular supply and movements of the hip joint;
4. describe the articular surfaces, type, capsule, ligaments, neurovascular supply and movements of the knee joint;
5. identify the arrangement of tarsus, metatarsus and the phalanges;

6. describe the articular surfaces, type, capsule, ligaments and movements at the ankle joint, and identify the relatively mobile joints of the foot, the anatomical subtalar, calceno talonavicular and calcenocuboidal joints;
7. state the components, the passive and active supports of the arches of the foot;
8. identify the muscles of gluteal region as functional groups; adductors/lateral rotators, abductors/medial rotators and extensor;
9. identify the anterior communication between the buttock and the pelvic cavity and perineum;
10. explain the neurovasculature of the gluteal region;
11. discuss the attachments, actions and neurovascular supply of the hamstring muscles;
12. discuss the attachments, actions and innervations of the muscles in the anterior and medial thigh;
13. identify the neurovasculature of the anterior and medial compartments of the thigh;
14. enumerate the boundaries and contents of the popliteal fossa;
15. explain the muscles of the three compartments of the leg in terms of attachment, innervation and action;
16. identify the neurovasculature of the popliteal and leg regions; and
17. classify the four layers of intrinsic muscles of the foot and discuss the neurovasculature of the foot.

Course Contents
Lower limb. Front and medial sides of the thigh. Gluteal region, back of the thigh and popliteal fossa. Leg, sole of foot, bones and joints. Surface anatomy. Applied and radiological anatomy of upper and lower limbs.

ANA 203: Histology of Basic Tissues (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the ultrastructure of a cell;
2. identify the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;
3. enumerate the components of extracellular matrix, fibres and ground substance;
4. identify the collagen and elastic fibres;
5. state the proteins of the ground substance;
6. identify the reticuloendothelial system and the various ways of classifying epithelial tissue;
7. explain the epithelial specialisations of the luminal and abluminal surfaces;
8. state the differences between microvilli, cilia and stereocilia;
9. explain the classifications of glands via morphology and method of secretion;
10. describe the light and electron microscopic pictures of muscle tissue;
11. state the ultrastructure of a neuron and the basic neuronal types;
12. explain synapses between neurons and motor end plates;
13. define myelination of nerve fibres and describe the structure of a peripheral nerve;
14. enumerate the supporting cells of the neurons centrally and peripherally; and
15. identify the structure of sense receptors, free nerve endings, Meissner's and Pacinian corpuscles and muscle spindle.

Course Contents
Components of the cell. Cell cycle. Chromosomes. Protein secretion and transcription of DNA. Introduction to light microscopy. Electron microscopy and units of measurement. Basic tissues of the body. The epithelial, connective and endothelial tissues. Muscle and nervous tissue. Lymphoid organs.

ANA 205: General Embryology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify gametogenesis and compare the process in male and female;
2. classify the hormonal, ovarian and endometrial cycles, and how they are interconnected;
3. enumerate the preconditions, phases and consequences of fertilization and describe cleavage and implantation;
4. describe the second week of development as the week of twos, cytotrophoblast and syncytiotrophoblast, epiblast and hypoblast, somatopleura and splanchnopleure, amniotic and yolk sac cavities;
5. discuss the establishment of body axes and fate maps during the gastrulation period (third week) and the role of genes in such process;
6. explain further development of the trophoblast during the third week of development;
7. identify the derivatives of the three germ layers and how they develop during the embryonic period (third to eighth week); and
8. describe the development of placenta and fetal membranes.

Course Contents
Gametogenesis. Cyclic changes in the female genital tract. Fertilization, cleavage, blastocyst, gastrulation and formation of germ layers. Segmentation of mesoderm. Folding of embryo foetal membranes. Umbilical cord and placentation. Development of limbs and teratology. Developmental anomalies and their clinical syndromes.

ANA 207: Practical Work (5 Units C: PH 225)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct practicals according to the contents of ANA 201 to 205.

Course Contents
Practical teaching according to the contents of ANA 201 to 205.

PHS 201: Introductory Physiology and the Autonomic Nervous System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe functional organisation of human body;
2. identify the concept of homeostasis and its failure, illness;
3. explain control systems of the body;
4. describe cell membrane and its functions;
5. recognise various cell organelles and intercellular connections;
6. describe various mechanisms of transport across cell membrane including active transport, passive transport, simple and facilitated diffusion;
7. identify the structure neuron and functions;
8. differentiate nerve fibres and nerve injury;
9. classify conduction of nerve impulse, nerve degeneration and regeneration;
10. describe synapses and neuromuscular junction;
11. classify muscles;
12. discuss skeletal muscle contraction and excitation-contraction coupling;
13. identify smooth muscle contraction;

14. appreciate nerve conduction studies;
15. interpret electromyograms (EMG);
16. explain rigor mortis and contractures;
17. describe myopathies/neuropathies;
18. describe functional organisation of autonomic nervous system;
19. discuss sympathetic division of autonomic nervous system;
20. discuss parasympathetic division of autonomic nervous system;
21. outline functions of autonomic nervous system;
22. enumerate sympathomimetic and sympatholytic drugs; and
23. list parasympathomimetic and parasympatholytic drugs.

Course Contents
Introduction to physiology and its place in Medicine. The composite cell, cell membrane and transport mechanisms, membrane potentials. Physiology of excitable tissues. Functional organization of autonomic nervous system (ANS). Basic characteristics of sympathetic and parasympathetic divisions. Introduction to human genetics. Biotechnology and human genome.

PHS 203: Blood Physiology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. classify the composition and functions of blood;
2. enumerate plasma proteins, albumin, globulin fibrinogen, and their functions;
3. explain red blood cells formation, erythropoiesis, hemoglobin and iron metabolism;
4. discuss various types of anaemia;
5. identify blood indices in various disorders, thalassemia;
6. describe white blood cells formation, leucopoiesis and functions;
7. discuss platelets, haemostasis, clotting factors and anticoagulants;
8. explain thrombocytopenia, clotting disorders, haemophilia;
9. describe the principles of blood grouping and blood transfusion reactions;
10. explain reticuloendothelial system;
11. define immunity and its classification;
12. describe the process of development of cell-mediated immunity;
13. explain the process of development of humoral immunity;
14. discuss physiological basis of immunisation; and
15. describe autoimmune diseases, allergy and immunological hypersensitivity reactions.

Course Contents
General characteristics and functions of blood. Properties and functions of plasma. Red blood cells factors involved in erythropoiesis, blood groups. White blood cells, origin, type, properties, functions, antigenicity and immunities. Platelets and hemostatic mechanisms. Reticulo-endothelial system. Clotting and fibrinolytic systems. Immunity and immunodeficiency disease and HIV.

PHS 205: The Cardiovascular System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the functional organisation of the heart and circulation;
2. enumerate properties of cardiac muscle and conduction system of the heart;
3. explain pace-maker potential and artificial pacemaker;

4. define cardiac cycle and its regulation;
5. state correlate cardiac cycle;
6. discuss electrocardiogram (ECG) and heart sounds;
7. demonstrate ECG-recording and interpretation;
8. explain mechanism of development of arrhythmias;
9. classify blood vessels;
10. explain the mechanism of local control of blood flow;
11. discuss cardiac output measurement and regulation;
12. evaluate arterial pulse;
13. evaluate arterial blood pressure;
14. explain foetal circulation and readjustments at birth; and
15. discuss vascular endothelium in cardiovascular control.

Course Contents
Overall plan and functions of the C.V.S. Physiologic anatomy of the heart. Mechanical events of cardiac cycle, cardiac output and its estimation. E.C.G. The Vascular system. Cross sectional area of different vascular groups, systolic, diastolic, pulse and mean pressures, exchange of fluids across the capillaries, venous and central venous pressures. Integration of C.V.S functions, central control centres, regulation of systemic blood pressure. Cardio-vascular adaptations in health and disease. Circulation through special areas. Vascular endothelium in cardiovascular control.

PHS 207: Physiology Practical (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate diffusion and osmosis and osmotic fragility of RBCs;
2. determine the number of red blood corpuscle and white blood cells per cubic millimetre of blood;
3. illustrate the differential leucocytes count;
4. explain hemoglobin concentration;
5. discuss packed cell volume and other haematological indices; and
6. determine the bleeding, clotting time of blood sample and blood group.

Course Contents
Osmotic fragility of RBCs. Differential leucocytes Count. Prothrombin time. Cross-matching of blood. Haematological indices (MCHC, MCV).

BCH 201: Cell Biology, PH and Buffer (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the role of electro transport chain and oxidative phosphorylation in the generation of ATP;
2. define genetic;
3. explain structure of chemistry and function of normal living cell;
4. discuss metabolism of proteins;
5. describe carbohydrates, nucleic acids and lipids;
6. illustrate basic biochemical importance; and
7. apply biochemical knowledge in the clinics.

Course Contents
Introduction to Biochemistry. Review of concepts in chemistry applicable to biological systems, chemical bonds covalent and ionic, biomolecules, elementary thermodynamics, reaction equilibria. Henderson equation application. Water, physical, biological and chemical properties. Acid-base chemistry, buffer systems and application to living systems. Introduction of terms used to describe acid-base disorders in the body, academia, alkalemia, acidosis and alkalosis. Enzymes, their properties and kinetics. Diversity of biomolecules, carbohydrates, lipids, proteins, amino acids and nucleic acids in nature. Structure, properties, and biochemical/biological functions of carbohydrates. Lipids, amino acids, proteins and nucleic acids.

BCH: 203 Carbohydrate Chemistry (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain classification and chemistry of carbohydrate;
2. discuss chemistry and biochemistry of the polysaccharide including the amino sugars; mucopolysaccharides, blood group substances;
3. illustrate structure of chemistry and function of normal living cell;
4. define metabolism of proteins;
5. describe carbohydrates, nucleic acids and lipids;
6. demonstrate basic biochemical importance; and
7. apply biochemical knowledge in the clinics.

Course Contents
Classification and chemistry of carbohydrate. Chemistry and biochemistry of the polysaccharide including the amino sugars, mucopolysaccharides, blood group substances.

BCH 205: Amino Acids Chemistry (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain chemistry and structure of the amino acids;
2. classify peptides, essential and non-essential amino acids;
3. define metabolism of proteins;
4. describe carbohydrates, nucleic acids and lipids;
5. illustrate how to apply correctly and interpret the results if different diagnostic test (for example, creatinine, urea, PS) in human diseases; and
6. apply biochemical knowledge in the clinics.

Course Contents
Chemistry and structure of the amino acids. Peptides, essential and non-essential amino acids.

BCH 207: Biochemistry Practical I (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. determine serum electrolyte;
2. recognise urea;
3. identify creatinine;
4. identify serum bilirubin;
5. recognise uric acid;

6. classify liver enzymes (ALT, AST and ALP); and
7. apply biochemical knowledge in the clinics.

Course Contents
Serum electrolyte determination. Urea determination. Creatinine determination. Serum bilirubin determination. Uric acid determination. Serum liver enzymes determination (ALT, AST and ALP).

BCH 209: Lipid Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define lipids;
2. enumerate classification, chemistry and function of lipids;
3. explain digestion and absorption of lipids in the bloodstream;
4. identify the lipoproteins; and
5. apply biochemical knowledge in the clinics.

Course Contents
Introduction to lipids, classification, chemistry and function of lipids. Digestion and absorption of lipids in the bloodstream. The lipoproteins.

CSS 201: Clinical Skills I (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate practical application of knowledge acquired in basic medical and basic clinical sciences;
2. apply practical knowledge acquired in basic medical and basic clinical sciences;
3. enhance early clinical exposure;
4. identify clinical skills; and
5. emphasise early acquisition of clinical skills.

Course Contents
Clinical application of basic medical and basic clinical sciences. Clinical skills. Principles of courses taught in basic medical and basic clinical science.

COM 201: Introduction to Medical Sociology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate human beings' make-up and physiological needs;
2. describe human culture within his/her environment;
3. explain components of the environment, physical, biological, socio-cultural;
4. differentiate between natural and man-made environment;
5. discuss behavioral and non-behavioral factors contributing to health and disease;
6. explain models and classification of health behaviour;
7. discuss community power structure and communication processes and their implication for the success or failure of health programme intervention;
8. explain family structures and patterns, marriage and family institutions; and
9. list functions of the families.

Course Contents
Description of Human beings' make-up and physiological needs. Human culture within his/her environment. Components of the environment, physical, biological, socio-cultural. Distinction between natural and man-made environment. Human organisations and Systems. Behavioral and non-behavioral factors contributing to health and disease. Models and classification of health behaviour. Community power structure and communication processes and their implication for the success or failure of health programme intervention. Family structures and patterns, marriage and family institutions. Functions of the families.

COM 203: Man and the Environment (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss climate change;
2. explain seasonal changes;
3. describe effect of environment on human health/diseases;
4. explain man's interaction with environment, adaptation process, balance and change; and
5. discuss human change processes, natural and planned.

Course Contents
Climate change. Seasonal changes. Effect of environment on human health/diseases. Man's interaction with environment, adaptation process, balance and change. Human change processes, natural and planned.

COM 205: Introduction to Medical Psychology (1 Unit C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain basic concepts in psychology, behavior, stimulus systems, motivation and moods.
2. describe basic cognitive process, learning and intelligence and memory;
3. discuss thinking and cognitive theories;
4. explain social psychology;
5. conduct behavioral research; and
6. discuss fundamentals of psychopathology.

Course Contents
Basic Concepts in Psychology, behavior, stimulus systems, motivation and moods. Basic cognitive process, learning and intelligence and memory. Thinking and cognitive theories. Personality. Introduction to social psychology. Introduction to behavioral research. Fundamentals of psychopathology.

MDH 201: History of Medicine (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain history/landmarks of medicine;
2. illustrate sociology of medicine/the patient as a person;
3. demonstrate communication/interviewing skills;
4. acquire literature, medicine and manuscript writing skills;
5. discuss computer in medicine, components of computers; and
6. illustrate computer techniques in medicine and applications in medical education.

Course Contents
History, landmarks of medicine. Sociology of medicine, the patient as a person. Communication, interviewing skills. Literature and medicine and manuscript writing skills. Medicine as a Profession, to give students a broad-based knowledge in applied medical sciences and an early orientation to medicine as a profession. Computer in medicine, components of computers. Computer techniques in Medicine. Hospital information system. Data analysis in medicine. Computer assisted decision making. Care of critically ill patients, computer assisted therapy. Medical imaging, telemedicine. Robotic surgery. Computer-based simulation and applications in medical education. Limitations.

MDH 203: Evolution of Medical Education in Nigeria (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. outline moral philosophy, clinical ethics and professionalism;
2. conduct communication/interviewing skills healthcare delivery as an inter-disciplinary profession human resource for health;
3. enumerate the roles of various healthcare specialists in MHD;
4. explain complimentary and alternate medicine;
5. describe human nutrition;
6. explain critical care medicine;
7. discuss herbal and traditional medicine;
8. describe spiritual medicine, energy and mind-body medicine;
9. explain biologically based medical practice;
10. discuss public health aspects of CAM; and
11. enumerate medical jurisprudence and professional liability issues.

Course Contents
Moral philosophy, clinical ethics and professionalism, communication, interviewing skills Healthcare delivery as an inter-disciplinary profession. Human resource for health. Introduction to, the roles of various healthcare specialists in MHD. Complimentary and alternate Medicine. Human nutrition. Critical care medicine. Psychology. Herbal and traditional medicine. Spiritual medicine. Energy and mind-body medicine. Biologically based medical practice. Public Health aspects of CAM. Medical jurisprudence and professional liability issues.

GST 212: Philosophy, Logic and Human Existence (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. know the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy and the centrality of logic in philosophical discourse;
3. know the elementary rules of reasoning;
4. distinguish between valid and invalid arguments;
5. think critically and assess arguments in texts, conversations and day-to-day discussions;
6. assess critically the rationality or otherwise of human conduct under different existential conditions;
7. develop the capacity to extrapolate and deploy expertise in logic to other areas of knowledge; and
8. guide his or her actions, using the knowledge and expertise acquired in philosophy and logic.

Course Contents
Scope of philosophy, notions, meanings, branches and problems of philosophy. Logic as an indispensable tool of philosophy. Elements of syllogism, symbolic logic-the first nine rules of inference. Informal fallacies, laws of thought, nature of arguments. Valid and invalid arguments, logic of form and logic of content-deduction, induction and inferences. Creative and critical thinking. Impact of philosophy on human existence. Philosophy and politics, philosophy and human conduct, philosophy and religion, philosophy and human values, philosophy and character molding.

ANA 202a: Gross Anatomy of Thorax and Abdomen (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the bones and joints of the thoracic cavity;
2. differentiate the muscles of respiration in terms of attachment, actions and neurovascular supply;
3. describe the neurovasculature of the thoracic wall, pleurae, lungs and the tracheobronchial tree;
4. describe the surfaces, borders, apex, fissures and the root of the lungs;
5. enumerate the 18-20 bronchopulmonary segments;
6. explain the layers and neurovascular supply of the pericardium as well as the pericardial space and sinuses;
7. identify the position, shape, surfaces, base, apex and borders of the heart;
8. differentiate the external and internal features of the heart chambers;
9. distinguish the fibrous skeleton and conducting system of the heart;
10. identify the vascular planes of the branches of the descending aorta;
11. explain the venous and lymphatics of the thoracic cavity;
12. describe the course of vagus and phrenic nerves in the thoracic cavity as well as the formation of autonomic nervous plexus in the thorax;
13. enumerate the course of trachea and oesophagus in the thoracic cavity;
14. list the attachments, actions and neurovascular supply of the diaphragm;
15. explain the divisions and communications of the peritoneal cavity;
16. identify the external and internal features as well as the neurovascular supply of the abdominal oesophagus; stomach, small and large intestine;
17. identify the external features, surfaces, borders and relations of the liver;
18. explain the parts of the gallbladder, its relations and neurovascular supply as well the extrahepatic biliary tree;
19. list the parts, relations and neurovascular supply of the pancreas;
20. describe the surfaces, borders, relations and neurovascular supply of the spleen;
21. identify the attachments of the renal fascia; and
22. discuss the relations and neurovascular supply of the kidneys and the suprarenal glands.

Course Contents
Thorax, thoracic wall, pleura, lungs. Heart and coronary vessels mediastinum and diaphragm. Abdomen, anterior abdominal wall, external genitalia, peritoneum, stomach and intestines, blood supply. Liver and gall bladder, pancreas, spleen, kidneys and suprarenal. Pelvis and surface anatomy. Radiological anatomy.

ANA 202b: Gross Anatomy of Pelvis and Perineum (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:

1. enumerate the three bones forming the wall of the pelvic cavity;
2. explain the articular surfaces and ligaments of the sacroiliac and lumbosacral joints as well as those of pubic symphysis;
3. identify the boundaries and planes of pelvic inlet and outlet as well as the axis of the pelvic cavity;
4. distinguish the various pelvic diameters and pelvic types;
5. describe the attachments, actions and neurovascular supply of the muscles forming the floor, lateral and posterior walls of the pelvic cavity;
6. identify the endopelvic fascia and its condensations;
7. enumerate the external and internal features of the rectum as well as its neurovascular supply;
8. list the external and internal features of the urinary bladder and its neurovascular supply;
9. describe the relations and neurovasculature of prostate;
10. explain the relations, external and internal features of the uterine tubes, uterus and vagina as well as their neurovasculature;
11. identify the divisions of perineum;
12. explain the male external genitalia and their neurovascular supply;
13. explain the female external genitalia and their microvasculature; and
14. discuss the boundaries and contents of ischiorectal fossa.

Course Contents
Perineum. Male and female perineum. Pelvic wall and floor. Pelvic peritoneum. Pelvic viscera. Sympathetic and parasympathetic neurovascular structures. Surface anatomy. Radiological anatomy.

ANA 204: Systemic Histology (Organology) (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define the ultrastructure of a cell;
2. describe the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;
3. identify the collagen and elastic fibres;
4. define the proteins of the ground substance;
5. describe the light microscopic features of the three heart layers including histology of the conducting system;
6. conduct the light microscopy of the elastic, muscular arteries and arterioles;
7. list the ultrastructure of the three types of endothelia;
8. identify the structure of veins;
9. explain the structure of lymphatic vessels and lymphoid organs including spleen;
10. describe the light microscopic picture of skin layers and structure of its appendages.;
11. explain the peculiarities of the thick skin of palms and soles;
12. describe the basic structure of the respiratory epithelium;
13. explain the structure of olfactory epithelium;
14. illustrate the basic arrangement of structures in the wall of airway;
15. describe the ultrastructure of blood-air barrier;
16. discuss the basic organisation of the wall of the gastrointestinal tract;
17. describe the light microscopic structure of all the different parts of the digestive tract;
18. describe the light microscopic structure of liver, pancreas and biliary tree;
19. explain the light microscopic structure of the different segments of nephron;
20. illustrate the ultrastructure of the glomerulus and the filtration barrier;
21. conduct the light microscopy of the prostate, erectile bodies and prepuce;

22. describe the light microscopic picture of the ovarian and endometrial cycles;
23. explain the light microscopic picture of the cervix and vagina;
24. describe female breast in various stages of development;
25. describe the light microscopic structure of the auricle, ear drum and membrane lining the tympanic cavity;
26. explain the light microscopic picture of the membranous labyrinth of the inner ear including the maculae, cristae and organ or Corti;
27. describe the light microscopic picture of eyelids, conjunctivae and the lens; and
28. list the layers of the eyeball and the layers of retina.

Course Contents
Cardiovascular system. Skin, gland of the skin. Structure of the nails and hair. Respiratory system. Digestive system. Neurological system. Musculo-skeletal system. Urinary and genital systems. Electron micrograph studies of each organ.

ANA 206: Systemic Embryology (Organogenesis) (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe gametogenesis and compare the process in male and female;
2. appraise the hormonal, ovarian and endometrial cycles and how they are interconnected;
3. list the preconditions, phases and consequences of fertilization;
4. describe cleavage and implantation;
5. explain the second week of development as the week of twos, cytotrophoblast and syncytiotrophoblast, epiblast and hypoblast, somatopleura and splanchnopleure, amniotic and yolk sac cavities;
6. discuss the establishment of body axes and fate maps during the gastrulation period (third week) and the role of genes in such process and illustrate the further development of the trophoblast during the third week of development;
7. discuss the derivatives of the three germ layers and how they develop during the embryonic period (third to eighth week); and
8. describe the development of placenta and fetal membranes.

Course Contents
Development of cardiovascular system, integumentary system, respiratory system, digestive system, urogenital system, nervous system. Developmental anomalies and their clinical syndromes.

ANA 208: Practical Work (5 Units C: PH 225)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct practicals according to the contents of ANA 202 to 206.

Course Contents
Practical teaching according to the contents of ANA 202 to 206.

PHS 202: Renal Physiology, Body Fluids and Temperature Regulation (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:

1. describe the structure of kidney and nephron;
2. list general functions of kidney;
3. describe GFR and factors regulating it;
4. explain the process of urine formation, filtration, reabsorption and secretion;
5. discuss the processes producing concentrated and diluted urine;
6. describe the regulation of blood pressure by kidneys;
7. list the hormones of kidney;
8. define acidification of urine;
9. conduct renal function tests;
10. discuss renal failure and haemodialysis; and
11. describe micturition reflex and abnormalities of micturition including incontinence.

Course Contents

The skin. Functional anatomy, temperature regulations, abnormalities of temperature regulation. Metabolism, factors regulating metabolism, conditions for measuring basal metabolic rate. Compartmentalization and composition of body fluids. Physiologic anatomy of the kidney, renal circulation and autoregulation. Glomerular filtration. Tubular transport. Urine formation, counter-current system. Water volume and ionic regulation. Acid-base balance. Micturition. Abnormalities of renal function.

PHS 204: Respiratory System (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the functional organisation of respiratory tract;
2. outline functions of lungs, respiratory and non-respiratory;
3. explain the mechanics of breathing;
4. discuss the role of surfactant compliance;
5. describe lung volumes and capacities;
6. discuss respiratory changes during exercise, mechanism of sneezing, yawning, cough;
7. explain obstructive/restrictive lung disease, FEV1/FVC;
8. differentiate types of respiratory failure, types I and II, artificial respiration; and
9. explain oxygen therapy and its toxicity.

Course Contents

Physiologic anatomy of respiratory apparatus. Brief review of relevant gas laws. Lung volumes. Mechanics of breathing. Gas diffusion through alveoli, capillary membrane. Pulmonary circulation, ventilation perfusion ratio. O2 and CO2 transport. Control of respiration, hypoxias, O2 treatment, abnormal types of breathing. Altitude and depth acclimatization. Respiratory adjustments in health and disease. Aerospace physiology. Deep sea diving.

PHS 206: Neuroscience I (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the functional organisation of nervous system;
2. classify nerve fibres;
3. list the properties of synaptic transmission;
4. outline neurotransmitters and neuropeptides;
5. classify types and functions of sensory receptors;
6. describe structure and functions of spinal cord;
7. identify reflex action and other reflexes;

8. describe muscle spindle and muscle tone, tactile, temperature and pain sensations;
9. explain the structure and functions of cerebral cortex;
10. describe motor pathways (pyramidal and extra pyramidal);
11. discuss basal ganglia, its connections and functions;
12. describe cerebellum, its connections and functions;
13. explain vestibular apparatus and regulation of posture and equilibrium, physiology of sleep and sleep disorders;
14. describe electroencephalogram (EEG) Physiology of memory, physiology of speech and its bnormalities;
15. identify thalamus- nuclei, functions and thalamic syndrome;
16. describe hypothalamus and limbic system;
17. explain analgesia system of the body, disorders of cranial nerves; and
18. describe higher mental function assessment.

Course Contents
Development and general plan of the central nervous system. Nerve morphology, generation and conduction of action potential. Sensory division of the nervous system, morphology receptors, sensory pathways, reticular formation, thalamus and sensory cortex.

PHS 208: Physiology Practical II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate cardiac cycle and effects of drugs on cardiac muscle of toad;
2. illustrate various methods of measuring arterial blood pressure and determining effect of posture and exercise on arterial blood pressure, recording and analysis of 12 lead electrocardiogram;
3. conduct an appropriate cardiac examination;
4. perform spirometry and vitalography;
5. perform urinalysis and urine microscopy; and
6. conduct microscopic examination of saliva.

Course Contents
The Cardiac cycle in toad. Effect of drugs on cardiac muscle of toad. Measurement of arterial blood pressure. Effect of posture on arterial blood pressure. Effect of exercise on arterial blood pressure. Recording of human electrocardiogram. Cardiac examination. Spirometry measurement of lung volumes. Vitalography. Urinalysis. Urine microscopy. Microscopic examination of saliva.

BCH 202: Nucleic Acids Chemistry (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe genome organisation and biosynthesis of proteins;
2. explain metabolism of purines and pyrimidines, nucleosides and nucleotides;
3. identify abnormalities in nucleic acid metabolism-xeroderma pigmentation and skin cancer;
4. explain overview of nitrogen metabolism;
5. define biosynthesis of amino acids and identify molecules derived from amino acids and biosynthesis;
6. discuss degradation of nucleotides; and
7. apply biochemical knowledge in the clinics.

Course Contents
Genome organisation and biosynthesis of proteins. Metabolism of purines and pyrimidines, nucleosides and nucleotides. Abnormalities in nucleic acid metabolism-xeroderma pigmentation and skin cancer. Overview of nitrogen metabolism, biosynthesis of amino acids. Molecules derived from amino acids and biosynthesis and degradation of nucleotides.

BCH 204: Enzymes, Coenzymes and Bioenergetics (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define enzymes and enumerate functions, nature and properties of enzymes;
2. describe kinetics of enzyme action;
3. enumerate allosteric effects;
4. explain enzyme assay in clinical medicine and immobilised enzymes;
5. identify hybridoma technology and monoclonal antibodies in medicine and biological research;
6. discuss the role of electron transport chain and oxidative phosphorylation in the generation of ATP, theories and models proposed for ATP generation; and
7. apply biochemical knowledge in the clinic.

Course Contents
Introduction to enzymes. Properties and functions, nature and properties of enzymes. Kinetics of enzyme action, allosteric effects. Enzyme assay in clinical medicine, immobilised enzymes, hybridoma technology and monoclonal antibodies in medicine and biological research. The role of electron transport chain and oxidative phosphorylation in the generation of ATP, theories and models proposed for ATP generation.

BCH 206: Amino Acids Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define the metabolism of amino acid;
2. outline transamination, oxidative deamination, decarboxylation;
3. discuss the urea cycle and its biochemical importance;
4. explain inborn errors of metabolism of some amino acids;
5. outline phenylketonuria, tyrosinosis, alkaptonuria, albinism, cystinuria; and
6. apply biochemical knowledge in the clinics.

Course Contents
Introduction to the metabolism of amino acid. Transamination, oxidative deamination, decarboxylation. The urea cycle and its biochemical importance's. Inborn errors of metabolism of some amino acids, phenylketonuria, tyrosinosis, alkaptonuria, albinism, cystinuria.

BCH 208: Carbohydrate Metabolism (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline glycolysis (Embden- Meyerhof pathway), aerobic and anaerobic phases;
2. explain the control mechanisms and substrate level phosphorylation;
3. illustrate the kerb's cycle/citric acid cycle;
4. discuss metabolism of galactose and fructose the uronic acid pathway gluconeogenesis, glycogenesis and glycogenolysis;

5. explain the HMP shunt and its biochemical importance; and
6. apply biochemical knowledge in the clinics.

Course Contents
Glycolysis (Embden- Meyerhof pathway), aerobic and anaerobic phases. Control mechanisms and substrate level phosphorylation. The kerb's cycle/citric acid cycle. Metabolism of galactose and fructose the uronic acid pathway gluconeogenesis, glycogenesis and glycogenolysis. The HMP shunt and its biochemical importance.

BCH 210: Biochemistry Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain practical and theoretical knowledge of the biochemical basis of human diseases;
2. describe serum cholesterol determination;
3. illustrate lipoprotein determination;
4. demonstrate an understanding of the nature, properties and clinical importance of enzymes;
5. interpret the results of different diagnostic test in human diseases; and
6. apply biochemical knowledge in the clinics.

Course Contents
Serum cholesterol determination. Lipoprotein determination.

MDH 202: Multidisciplinary Healthcare I (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the inter-relationship between the different healthcare professionals;
2. outline complimentary roles in healthcare delivery;
3. discuss a broad based knowledge in applied medical sciences and an early orientation to multidisciplinary healthcare delivery;
4. appreciate early orientation to multidisciplinary healthcare delivery;
5. prioritise unity team approach to patient care; and
6. define basic medical terms and components of the medical interview.

Course Contents
Moral Philosophy. Clinical ethics and professionalism. Communication/interviewing skills healthcare delivery as an inter-disciplinary profession. Human resource for health. Introduction to the roles of various healthcare specialists in MHD, complimentary and alternate Medicine, human Nutrition, critical care medicine, psychology, complementary and Alternative Medicine. Herbal and traditional medicine. Spiritual medicine. Energy and mind-body medicine. Biologically based medical practice. Public health aspects of CAM. Medical jurisprudence and professional liability issues.

MDH 204: Computers in Medicine (1 Units C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss history of computer;
2. list functional components and characteristics of computer;

3. explain problem solving, flow chart, algorithms computer programming, symbolic names, array, subscripts, exposition and control statements;
4. outline basic programming languages, computer application;
5. enumerate data types, constants and variables, statement types, assignment types, input-output statements, control statements;
6. describe data base management systems, creation, access and storage in files;
7. demonstrate an understanding of the role and importance of computers in practice of medicine and research; and
8. experience practical posting to computer centres.

Course Contents
History of computer. Functional components of computer. Characteristics of computer. Problem solving. Flow chart. Algorithms computer. Programming, statements, symbolic names, array, subscripts, exposition and control statement. Introduction to basic programming languages, computer application. Introduction to Basic Programming. Data types, constants and variables. Statement types, Assignment types, Input-output Statements. Control Statements. Data Base Management Systems. Creation, access and storage in files. Practical posting to computer centres.

CSS 202: Clinical Skills II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate practical application of knowledge acquired in basic medical and basic clinical sciences;
2. apply practical knowledge acquired in basic medical and basic clinical sciences;
3. develop early clinical exposure;
4. identify clinical skills; and
5. recognise early acquisition of clinical skills.

Course Contents
Clinical application of basic medical and basic clinical sciences. Clinical skills. Principles of courses taught in basic medical and basic clinical science.

300 Level

ANA 301: Gross Anatomy of Head and Neck and Neuroanatomy (4 Units C: LH 60)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the features of the cervical vertebrae and articulations between them;
2. discuss the articular surfaces, ligaments and movements of the atlantooccipital and atlantoaxial joints;
3. identify the parts of hyoid bone;
4. outline the different layers of the cervical fasciae and their attachments;
5. differentiate the boundaries and contents of different regions and triangles of the neck;
6. explain the formation and the sensory and motor branches of the cervical plexus of nerves;
7. identify the structures of the root of the neck and describe the external features and neurovascular supply of thyroid gland;
8. discuss how the different cartilages, ligaments and muscles of the larynx articulate and attach to produce the whole structure;

9. describe the neurovascular supply to the larynx;
10. explain the attachments of constrictors and inner longitudinal layer of the pharynx as well as their neurovasculature;
11. identify the internal features of the different parts of the pharynx;
12. describe the different surfaces of articulated neuro- and viscerocranium and illustrate the layers of scalp;
13. list the muscles of face around the orbital, nasal and oral orifices in terms of attachments and functions; and
14. discuss the neurovasculature of the scalp and face.

Course Contents

Head and neck. Face and scalp. Back and spinal cord. Cranial cavity. Orbit, parotid, temporal and infratemporal regions. Triangles of neck, submandibular region, nerves and vessels in deep dissection of neck. Thyroid and parathyroid. Pre-vertebral region and joints of neck. Mouth and tongue, pharynx, palato-nasal cavity and sinuses, larynx, ear and eye.
Neuroanatomy. Meninges, base of brain and blood supply, hindbrain, medulla, pons, cerebellum and 4th ventricle, midbrain, diencephalon and third ventricle, cerebral hemispheres, sulci and gyri, internal structure of cerebrum and lateral ventricle, basal nuclei, 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 Head and Neck. Brain and spinal cord.

ANA 303: Histology of Special Senses and Neuro-Histology/Histo-Chemistry (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:
1. define the ultrastructure of a cell;
2. describe the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;
3. explain the collagen and elastic fibres;
4. describe the proteins of the ground substance;
5. define the reticuloendothelial system;
6. discuss the various ways of classifying epithelial tissue;
7. outline the epithelial specialisations of the luminal and abluminal surfaces;
8. differentiate between microvilli, cilia and stereocilia;
9. explain the classifications of glands via morphology and method of secretion;
10. describe the light and electron microscopic pictures of muscle tissue;
11. identify synapses between neurons and motor end plates;
12. define myelination of nerve fibres and describe the structure of a peripheral nerve;
13. outline the supporting cells of the neurons centrally and peripherally;
14. explain the structure of sense receptors, free nerve endings, Meissner's and Pacinian corpuscles and muscle spindle;
15. describe the light microscopic features of the three heart layers including histology of the conducting system;
16. demonstrate the light microscopy of the elastic, muscular arteries and arterioles;
17. enumerate the ultrastructure of the three types of endothelia;
18. define the structure of veins;
19. describe the structure of lymphatic vessels and lymphoid organs including spleen;
20. discuss the light microscopic picture of skin layers and structure of its appendages;
21. outline the peculiarities of the thick skin of palms and soles;

22. describe the basic structure of the respiratory epithelium;
23. define the structure of olfactory epithelium;
24. explain the basic arrangement of structures in the wall of airway;
25. discuss the light microscopic picture of the membranous labyrinth of the inner ear including the maculae, cristae and organ or Corti;
26. describe the light microscopic picture of eyelids, conjunctivae and the lens;
27. identify the layers of the eyeball;
28. state the layers of retina;
29. describe stained sections of the spinal cord and brainstem at various levels; and
30. distinguish the cortical layers of the cerebrum and cerebellum.

Course Contents
Neurohistology. Spinal cord, brain stem, cerebrum and cerebellum. Organs of special senses, sensory receptors, eyes, ear and nose. Histology of endocrine organs. Principles and techniques of histochemistry including immunocytochemistry.

ANA 305: Neuro-Embryology and Development of Pharyngeal Apparatus
(2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain gametogenesis and compare the process in male and female;
2. describe the hormonal, ovarian and endometrial cycles and how they are interconnected;
3. outline the preconditions, phases and consequences of fertilization;
4. describe cleavage and implantation;
5. discuss the establishment of body axes and fate maps during the gastrulation period, third week and the role of genes in such process;
6. explain further development of the trophoblast during the third week of development;
7. outline the derivatives of the three germ layers and how they develop during the embryonic period, third to eighth week;
8. describe the development of placenta and fetal membranes;
9. explain the development of membranous and cartilaginous neurocranium;
10. describe the development of the limbs and the vertebral column;
11. outline the development of cardiac loop, sinus venosus as well as cardiac septa;
12. describe the development of aortic arches and the venous system;
13. explain fetal circulation and the transition happening after birth;
14. describe the development of the respiratory bud and the origins of the respiratory epithelium, smooth muscle and cartilages;
15. discuss the formation of body cavity and the diaphragm;
16. describe the developments of the derivatives of the foregut, its artery as well as dorsal and ventral mesentry;
17. outline the development of the midgut, its rotation and its artery and dorsal mesentry;
18. describe the development of the hindgut;
19. explain the developments of the three systems of kidneys and that of the excretory and collecting system of the kidneys;
20. describe the developments of bladder in urethra from the upper and pelvic parts of the urogenital sinus and contrast the process in males and females;
21. explain and compare and contrast the development of gonads and genital tracts in males and females and explain the role of genes and hormones in this process;
22. explain, compare and contrast the development of external genitalia in males and females and the roles of genes and hormones in this process;
23. outline the derivatives of the pharyngeal arches, pouches and clefts;

24. explain the developments and origins of the three parts of the ear; and
25. describe the development of eyelids, conjunctival sac, lens vesicle and eyeball.

Course Contents
Development of the face, pharyngeal derivatives and teratology. Development of nervous system and sense organs. Developmental anomalies and their clinical syndromes.

ANA 307: Human Genetics (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the chromosome theory of inheritance;
2. describe the process of cell division; mitotic and meiotic;
3. appreciate introduction to karyotyping and cytogenetic analysis techniques;
4. explain how abnormalities in chromosome number and structure arise;
5. define single gene mutations; and
6. identify the phenotypic expressions of some selected chromosomal and single gene mutation abnormalities.

Course Contents
Fundamental human genetic principles. Variation in gene expression in man. Patterns of inheritances in families (autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive, Y-linked and sex influenced). Cytogenetics, types and classification of human chromosomes. Methods of preparation of human chromosomes and Karyotyping. Types of numerical and structural chromosome aberrations and their causes. Gene hybridisation. Human genomic studies.

ANA 309: Laboratory Techniques for Light Microscopy/Gross Radiologic Techniques (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate the practical step by step method of tissue processing for light microscope study;
2. demonstrate the principles and techniques for the use of advance light microscopes;
3. classify polarising microscope, phase contrast microscope, interference microscope, dark-field microscope and ultraviolet microscope;
4. discuss basic principles of radiological imaging of human tissue;
5. identify radiological of major body structures;
6. appreciate introduction to modern imaging techniques; and
7. state precautionary measures.

Course Contents
The practical step by step method of tissue processing for light microscope study shall be taught and demonstrated. The principles and techniques for the use of advance light microscopes will be taught and where possible demonstrated. Polarising microscope. Phase contrast microscope. Interference microscope. Dark-Field microscope, and ultraviolet microscope. Basic principles of radiological imaging of human tissue. Radiological identification of major body structures. Introduction to modern imaging techniques. Precautionary measures.

ANA 311: Practical Work (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. identify organs, tissues and other structures in the head and neck region;
2. trace cause and relation of various structures and organs in the head and neck;
3. explain variations in location and relation of anatomical structures in the head and neck;
4. demonstrate dissection techniques; and
5. recognise histological patterns of head and neck tissues.

Course Contents
Practical work in line with the principles of ANA 301 to 307.

PHS 301: Gastrointestinal Physiology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline different parts of the GIT and their functions;
2. define the enteric nervous system;
3. explain the processes of mastication and swallowing and their control;
4. enumerate functions and movements of stomach, small intestine and large intestine;
5. list hormones of GIT and their functions;
6. discuss vomiting and its pathway;
7. explain the process of defecation and its pathway; and
8. discuss regulation of feeding and energy expenditure.

Course Contents
Physiologic anatomy of the gastrointestinal tract. Review of smooth muscle function. Secretions in the G.I.T. and their control. Movements of the gastrointestinal tract. Digestion and absorption of various food substances. Liver and its functions. Disorders of G.I.T. The Gut as an endocrine organ.

PHS 303: Endocrinology and Reproduction (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline general principles (classification, mechanism of action, feedback control) of hormones;
2. describe physiology of growth;
3. define calcium metabolism and glucose metabolism;
4. describe the functional anatomy of male reproductive system;
5. discuss spermatogenesis and semen analysis, erection and ejaculation;
6. discuss testosterone and male puberty;
7. describe the functional anatomy of female reproductive system, gonads and oogenesis;
8. discuss oestrogen and progesterone;
9. explain menstrual cycle, puberty and menopause;
10. describe the physiological changes in mother's body during pregnancy;
11. discuss physiology of parturition and lactation;
12. define contraception;
13. interpret pregnancy tests; and
14. discuss assisted fertility techniques.

Course Contents
Endocrine system. Introduction and neuroendocrine relationship. Hypothalamo-pituitary axis, Endocrine glands, normal, hypo- and hyper-functions. Other hormones of some clinical importance. Physiologic anatomy of male and female reproductive system. Male and female sex hormones. Cyclicity of hormone secretion in females. Physiology of contraception. Assisted fertility techniques.

PHS 305: Pathophysiology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline causes and mechanism of cellular adaptations, cell injury, cell death and apoptosis, cancer and aging;
2. describe the aetiology and pathogenesis of anaemias;
3. state disorders of haemostasis;
4. explain blood transfusion and its complications;
5. outline autoimmune diseases, allergy and immunological hypersensitivity reactions;
6. state and describe disorders of peripheral circulation;
7. describe disorders of cardiac rhythm and conduction;
8. outline the pathophysiology of heart failure, hypertension and ischemic heart disease;
9. differentiate obstructive and restrictive pulmonary diseases;
10. discuss pulmonary arterial hypertension and pulmonary oedema;
11. explain nephritic and nephrotic syndrome;
12. describe the pathophysiology of acute and chronic renal failure;
13. discuss tetany and pathophysiology of cramps; and
14. define acidosis and alkalosis.

Course Contents
Introduction to pathophysiology. Cellular response to persistent stress, adaptations hyperplasia, hypertrophy, metaplasia, atrophy, intracellular accumulations, cell injury death and senescence mechanisms of cell injury, programmed cell death and necrosis, cellular ageing. Pathophysiology of prolonged bleeding time, purpura, haemophilia, hemoglobinopathies, pathophysiology of sickle cell disease, thalassemia, hypersplenism. Pathophysiology of anaemia, megaloblastic anaemia, pathophysiology erythroblastosis fetalis, incompatible blood transfusion. Pathophysiology of palpitation, cardiac arrhythmia, heart block, angina pectoris, myocardial infarction, murmurs, pathophysiology of heart failure, hypertension, Reynold's disease, pulmonary embolism, pulmonary oedema, pulmonary hypertensions and cor pulmonale. Pathophysiology of cerebral blood flow disturbance (stroke), pathophysiology oedema and lymphedema, pathophysiology of syncope and postural hypotension. Respiratory distress syndrome, Pathophysiology of haemothorax hydrothorax and pneumothorax. Pathophysiology of bronchial asthma, bronchitis and pneumonia, hypoxia and cyanosis, Undine's curse, pathophysiology of respiratory acidosis. Pathophysiology of tachypnoea, apnoea and asphyxia. Pathophysiology of cough and sneezing, hiccup and yawning. Pathophysiology of albuminuria, nephritic and nephrotic syndrome, acute tubular necrosis. Glycosuria, pathophysiology of kidney stone, hydro-nephrosis, pyelonephritis and haemonephrosis. Causes of haematuria, causes of urine retention, dehydration and over-hydration.

PHS 307: Laboratory Teaching and Instrumentation (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:

1. develop an opportunity to review the physiological concept of systems taught;
2. outline thoroughly the physiological concept of systems taught; and
3. demonstrate the concept using available equipment to medical or junior physiology students.

Course Contents
Review the Physiological concept of systems taught. Understand the physiological concept of systems taught thoroughly. Enable them to demonstrate the concept using available equipment to Medical or more junior physiology students.

PHS 309: Neuroendocrinology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the functional organisation of nervous system;
2. define nerve fibres;
3. enumerate the properties of synaptic transmission;
4. outline neurotransmitters and neuropeptides;
5. list types and functions of sensory receptors;
6. describe structure and functions of spinal cord;
7. discuss reflex action and other reflexes;
8. explain muscle spindle and muscle tone, tactile, temperature and pain sensations;
9. describe the structure and functions of cerebral cortex;
10. outline Motor pathways (pyramidal and extra pyramidal);
11. explain Basal ganglia, its connections and functions;
12. define cerebellum, its connections and functions;
13. describe vestibular apparatus and regulation of posture and equilibrium, physiology of sleep and sleep disorders, electroencephalogram (EEG) Physiology of memory, physiology of speech and its abnormalities;
14. explain thalamus- nuclei, functions and thalamic syndrome;
15. discuss hypothalamus and limbic system; and
16. describe analgesia system of the body disorders of cranial nerves and higher mental function assessment.

Course Contents
Historical origins of a Neuro-endocrine connection. A review of the physiologic anatomy of hypothalamo-pituitary link. Current concepts of channels of communication between the hypothalamus and the pituitary. Hypothalamic neurosecretions. The "master gland" of the endocrine system. Pituitary secretions and their current concepts of the servomechanisms between the hypothalamus, the pituitary and other endocrine organs.

PHS 311: Pathophysiology II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the mechanism and causes of vomiting;
2. describe the pathophysiology of dysphagia, achalasia and upper oesophageal regurgitation;
3. discuss the pathophysiology of gastric and duodenal ulcer, intestine malabsorption, intestinal obstruction-Ileus;
4. list dysfunctions of the colon, diarrheal, constipation, irritable colon and flatulence;
5. describe acute and chronic pancreatitis;

6. differentiate various types of Hepatitis;
7. explain cirrhosis of the liver and portal hypertension;
8. differentiate cholelithiasis and cholecystitis;
9. classify jaundices and describe its pathogenesis;
10. describe the pathophysiology of starvation, malnutrition and obesity;
11. differentiate hyperfunction and hypofunction of anterior pituitary gland;
12. explain alterations of the posterior pituitary gland hormones;
13. delineate hyperthyroidism and hypothyroidism;
14. describe hypersecretion and hyposecretion of adrenal cortex hormones;
15. explain dysfunction of adrenal medulla;
16. outline diabetes mellitus, aetiology and pathogenesis;
17. discuss pathophysiology of infertility and sexual disorders;
18. explain the pathophysiology tremors, pathophysiology of basal ganglia lesions;
19. define epilepsy, and discuss its aetiology and pathogenesis;
20. outline the pathophysiology of demyelination (multiple sclerosis);
21. explain the pathophysiology of olfaction and taste abnormalities; and
22. discuss pathophysiology of depressions.

Course Contents

Pathophysiology of stomatitis, xerostomia, dysphagia, achalasia and upper oesophageal regurgitation. Pathophysiology of peptic ulcer, gastric and duodenal, pathophysiology and causes of vomiting, acute pancreatitis, pathophysiology of paralytic ileus, causes of diarrheal and constipation, irritable bowel syndrome, ulcerative colitis. Pathophysiology of jaundice, hepatitis, and cholecystitis, types of bile stones, predisposing factors for hepatic cancer and cancer head of pancreas. Pathophysiology of gigantism, acromegaly, dwarfism infantilism, Simmons disease pathophysiology of cretinism, myxoedema and Grave's disease. Pathophysiology of exophthalmos, Addison's disease, Cushing disease, virilism. Pathophysiology of male infertility, azoospermia, male chromosomal disturbances and impotence puberty disturbances, disturbance of female menstrual cycle, pathophysiology of conception, lactation and hormones acting on mammary glands. Pathophysiology of sensory disturbances pathophysiology syringomyelia, aneuropathies, neurosyphilis, thalamic syndrome, herpes simplex. Pathophysiology of pain, types of pain, hyperalgesia algesia, and allodynia. Pathophysiology of headache. Pathophysiology of tendon jerk, knee, ankle, biceps and triceps. Pathophysiology of cerebral palsy, muscle tone changes. Pathophysiology of basal ganglia lesions. Pathophysiology of chorea, athetosis and hemiballismus. Pathophysiology of parkinsonism, pathophysiology and causes of course tremors and fine tremors. Pathophysiology of gait change, pathophysiology of social behaviour. Pathophysiology of ataxia, sensory and motor ataxia. Pathophysiology of memory disturbances, anterograde and retrograde amnesia, speech disturbance. Pathophysiology of balance and equilibrium complete and incomplete section of spinal cord. Causes of aphasia. Pathophysiology of corneal opacity, cataract, glaucoma, pathophysiology of errors of refraction, myopia, and hypermetropia, pathophysiology of visual pathway disturbance, disturbances colour vision. Deafness. Pathophysiology of hearing disturbance. Pathophysiology of anosmia, hyposomnia pathophysiology of taste disturbances, ageusia hypogeusia and dysgeusia. Pathophysiology of myasthenia gravis, muscle dystrophy, intestinal colic, sympathomimetic and sympatholytics, pathophysiology of demyelinating disease pathophysiology of muscle denervation. Pathophysiology of botulinum and tetanus toxoid, Eaton-lambert syndrome, schizophrenia, pathophysiology of depressions.

BCH 301: Metabolism of Nucleic Acids and Protein Synthesis (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline metabolism of proteins, carbohydrates, nucleic acids and lipids;
2. describe overview of nitrogen metabolism;
3. define biosynthesis of amino acids;
4. outline molecules derived from amino acids; and
5. explain biosynthesis and degradation of nucleotides.

Course Contents
Overview of nitrogen metabolism. Biosynthesis of amino acids. Molecules derived from amino acids and biosynthesis and degradation of nucleotides.

BCH 303: Integration of Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the structure, chemistry and function of normal living cell;
2. describe the nature, properties and clinical importance of enzymes;
3. enumerate the biochemical functions of biological membranes, vitamins, hormones;
4. discuss the biochemistry of ageing, nervous and muscle actions;
5. interpret the results of different diagnostic test in human diseases;
6. discuss porphyrins, haemoglobinopathies, hybridoma technology in medicine;
7. describe applications of immunotherapy assay of hormones; and
8. apply biochemical knowledge in the clinics.

Course Contents
Tissue-specific metabolism. The division of labour and hormonal regulation of fuel metabolism.

BCH 305: Nutrition (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. outline general nutrition requirement, energy aspect of diet, basal metabolic rate (BMR) and specific dynamic action (SDA);
2. enumerate the major nutritional disorder, kwashiorkor, marasmus, obesity, iron sources;
3. define absorption, distribution in the body and biochemical function excretion;
4. describe anaemia and hemochromatosis, water and the major ions: H+, Na+, K+, Ca++ HCO3;
5. explain fluid intake and output;
6. discuss total body water distribution, intracellular and extracellular fluids,
7. define trace element, calcium and phosphorus;
8. explain metabolism and significances in the body; and
9. apply biochemical knowledge in the clinics.

Course Contents
General nutrition requirement, energy aspect of diet, basal metabolic rate (BMR) and specific dynamic action (SDA). The major nutritional disorder. Kwashiorkor, marasmus, obesity, iron. Sources' absorption, distribution in the body and biochemical function excretion, anaemia, and hemochromatosis. Water and the major icons: H+, Na+, K+, Ca++ HCO3, fluid intake and

output. Total body water distribution intracellular and extracellular fluids. Trace element. Calcium and phosphorus, metabolism and significances in the body.

BCH 307: Biochemical Genetics and Molecular Biology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define gene cloning and the application of recombinant DNA technology in medicine;
2. describe genetic translocation and gene rearrangement in diseases state;
3. explain application of immunotherapy, molecular and cell biology, DNA replication and transcription, RNA and relationship to DNA;
4. define genetic code;
5. outline biosynthesis of protein and regulation of gene expression;
6. discuss tools of genetic engineering (molecular biology), hybridisation, molecular cloning, southern blotting and related techniques, polymerase chain reaction (PCR) and its application to medicine;
7. describe molecular and biochemical basis of inheritance of common diseases, haemoglobinopathies;
8. outline gene therapy, biochemical aspects of cancer and cancer therapy;
9. explain personalised medicine; and
10. apply biochemical knowledge in the clinics.

Course Contents
Gene cloning and the application of recombinant DNA technology in medicine. Application of immunotherapy. Molecular and cell biology. DNA, replication and transcription. RNA and relationship to DNA. Genetic code. Biosynthesis of protein and regulation of gene expression. Tools of genetic engineering (molecular biology). Hybridisation, molecular cloning, southern blotting and related techniques, polymerase chain reaction (PCR) and its application to medicine. Molecular and biochemical basis of inheritance of common diseases, haemoglobinopathies. Gene therapy. Biochemical aspects of cancer and cancer therapy. Personalised medicine.

BCH 309: Special Topics (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline endocrinology structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones;
2. describe xenobiotics and forensic biochemistry detoxification mechanisms;
3. define metabolism of foreign compounds;
4. explain induction of microsomal enzymes and drug resistance;
5. identify medico-legal, blood, urine and sweat test;
6. describe recent development in forensic techniques;
7. discuss the biochemistry of ageing, nervous and muscle actions;
8. apply knowledge of basic research methodologies in biochemistry and molecular biology;
9. interpret the results of different diagnostic test in human diseases;
10. discuss porphyrins, haemoglobinopathies, hybridoma technology in medicine;
11. outline biochemistry of the viruses, spread, detection, drug treatment and others;
12. describe applications of immunotherapy assay of hormones; and
13. review current biochemical topics.

Course Contents
Endocrinology structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones. Xenobiotics and forensic biochemistry. Detoxification mechanisms, metabolism of foreign compounds. Induction of microsomal enzymes and drug resistance. medico-legal, blood, urine and sweat test. Recent development in forensic techniques. Basic concept of aging, metabolic processes and aging, apoptosis, concept, pathways (intrinsic and extrinsic), role of oxidative stress in ageing, biochemical functions of nervous systems, neurotransmitters, biosynthesis and breakdown, diseases affecting the nervous tissues, muscles action. Biochemical and molecular concept, control. Metabolism of drugs and other foreign compounds. Cytochrome P450 and its isozymes microsomal enzymes in drugs metabolism and the toxicological consequences. The structure of biological membrane transport and diseases. Retroviruses, molecular basis and involvement in cancer. AIDS, biochemistry of the viruses, spread, detection, drug treatment and other. Cancer proto-oncogenes and oncogenes. Biochemical features of tropical disease. Gene rearrangement in Burkett's lymphoma and other disease, genetic regulation of metabolism, the operon concept, induction and repression. Review of current biochemical topics.

MDH 301: Multidisciplinary Healthcare II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
7. describe the inter-relationship between the different healthcare professionals;
8. outline complimentary roles in healthcare delivery;
9. discuss a broad based knowledge in applied medical sciences and an early orientation to multidisciplinary healthcare delivery;
10. appreciate early orientation to multidisciplinary healthcare delivery;
11. prioritise unity team approach to patient care; and
12. define basic medical terms and components of the medical interview.

Course Contents
Moral Philosophy. Clinical ethics and professionalism. Communication/interviewing skills healthcare delivery as an inter-disciplinary profession. Human resource for health. Introduction to the roles of various healthcare specialists in MHD, complimentary and alternate Medicine, human Nutrition, critical care medicine, psychology, complementary and Alternative Medicine. Herbal and traditional medicine. Spiritual medicine. Energy and mind-body medicine. Biologically based medical practice. Public health aspects of CAM.
Medical jurisprudence and professional liability issues.

CSS 301: Clinical Skills III (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate and apply practical knowledge acquired in basic medical and basic clinical sciences;
2. develop early clinical exposure;
3. identify clinical skills; and
4. emphasise early acquisition of clinical skills.

Course Contents
Clinical application of basic medical and basic clinical sciences. Clinical skills. Principles of courses taught in basic medical and basic clinical science.

GST 312: Peace and Conflict Resolution (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. analyse the concepts of peace, conflict, and security;
2. list major forms, types and root causes of conflict and violence;
3. differentiate between conflict and terrorism;
4. enumerate security and peace building strategies; and
5. describe roles of international organisations, media and traditional institutions in peace building.

Course Contents
Concepts of Peace. Conflict and security in a multi-ethnic nation. Types and theories of conflicts, ethnic, religious, economic, geo-political conflicts. Structural conflict theory, realist theory of conflict, frustration-aggression conflict theory. Root causes of conflict and violence in Africa, indigene and settlers Phenomenon. Boundaries/boarder disputes. Political disputes. Ethnic disputes and rivalries. Economic inequalities. Social disputes. Nationalist movements and agitations. Selected conflict case studies. Tiv-Junkun, Zango Kartaf, chieftaincy and land disputes. Peace building. Management of conflicts and security. Peace & human development. Approaches to peace and conflict management (religious, government, community leaders). Elements of peace studies and conflict resolution. Conflict dynamics assessment scales. Constructive and destructive. Justice and legal framework. Concepts of social justice. The Nigeria legal system. Insurgency and terrorism, peace mediation and peace keeping. Peace and security council (international, national and local levels). Agents of conflict resolution, conventions, treaties, community policing. Evolution and imperatives. Alternative dispute resolution (ADR). Dialogue, arbitration, negotiation and collaboration. Roles of international organizations in conflict resolution, the United Nations, (UN) and its conflict resolution organs, the African union and peace security council, ECOWAS in peace keeping. Media and traditional institutions in peace building. Managing post-conflict situations, crisis. Refugees, internally displaced persons, IDPs. The role of NGOs in post-conflict situations, crisis.

ENT 312: Venture Creation (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the key steps in venture creation;
2. identify opportunities in problems and in high potential sectors regardless of geographical location;
3. state how original products, ideas, and concepts are developed;
4. develop business concept for further incubation or pitching for funding;
5. identify key sources of entrepreneurial finance;
6. implement the requirements for establishing and managing micro and small enterprises;
7. conduct entrepreneurial marketing and e-commerce;
8. apply a wide variety of emerging technological solutions to entrepreneurship; and
9. appreciate why ventures fail due to lack of planning and poor implementation.

Course Contents
Opportunity identification (sources of business opportunities in Nigeria, environmental scanning, demand and supply gap/unmet needs/market gaps/market research, unutilised resources, social and climate conditions and technology adoption gap). New business development (business planning, market research). Entrepreneurial finance (venture capital, equity finance, Micro finance, Personal savings, small business investment organizations and

business plan competition). Entrepreneurial marketing and e-commerce (principles of marketing, customer acquisition and retention, B2B, C2C and B2C models of e-commerce, first mover advantage, E-commerce business models and successful E-commerce companies,). Small business management/family business. Leadership and management, basic book keeping, nature of family business and family business growth model. Negotiation and business communication (strategy and tactics of negotiation, bargaining, traditional and modern business communication methods). Opportunity discovery demonstrations (business idea generation presentations, business idea contest, brainstorming sessions, idea pitching), technological solutions (the concept of market/customer solution, customer solution and emerging technologies, business applications of new technologies. Artificial intelligence (AI). Virtual/mixed reality (VR). Internet of things (IoTs). Blockchain. Cloud computing. Renewable energy. Digital Business and e-commerce strategies).

PAT 302: General Pathology I (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. define pathology;
2. enumerate the aetiologic factors of disease;
3. list causes and mechanism of cell injury including free radical injury, cell death and apoptosis;
4. describe the adaptations of cell growth and differentiation, hypertrophy, hyperplasia, metaplasia and atrophy;
5. explain the processes of cutaneous wound healing and repair;
6. describe cell cycle and define acute inflammation;
7. discuss causes of inflammation, vascular and cellular events in acute inflammation;
8. explain mediators of acute inflammation, vaso-active amines, plasma derived, serous/fibrinous inflammation;
9. explain outcome of inflammation;
10. describe chronic inflammation, granulomatous inflammation;
11. discuss systemic effects of inflammation; and
12. state consequences of deficient/excess inflammation.

Course Contents

Introduction, basic definitions, aetiology of disease. Cell injury, cellular adaptation, cell death (necrosis and apoptosis). Free radicals. Ischemic cell injury. Cutaneous wound healing and repair. Inflammation, definition and causes of acute inflammation. Vascular and cellular events in acute inflammation. Mediators of acute inflammation (vaso-active amines, plasma derived). Serous/fibrinous inflammation, chronic inflammation, granulomatous inflammation. Systemic effects of inflammation. Consequences of deficient/excess inflammation. Genetic disorders, classification (chromosomal, single gene and multifactorial). Chromosomal disorders (Down, Turner, Klinefelter, Edwards syndromes). Single gene disorders (classic and non classic). Mutations and multifactorial disorders. Congenital anomalies, types, aetiology. Teratogenesis.

PAT 304: General Pathology II (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. describe innate and adaptive immunity;
2. outline components of immune system;
3. define types of hypersensitivity disorders;
4. define the role of MHC in disease;

5. explain various mechanisms of tolerance and autoimmunity;
6. describe primary immunodeficiency;
7. discuss the pathology of HIV/AIDS and amyloidosis;
8. define oedema, embolism, thrombosis and shock;
9. explain pathophysiologic mechanisms and pathogenesis underlying oedema, embolism, thrombosis and shock;
10. enumerate morphologic and clinical features of oedema, embolism, thrombosis, shock;
11. define types of pathologic calcification;
12. explain fatty change and cellular accumulations of protein, glycogen and pigments; and
13. describe management of infectious diseases.

Course Contents

Immunopathology. Innate and adaptive immunity. Components of immune system (cells, tissues and molecules). Hypersensitivity disorders. Major histocompatibility complex. Mechanism of tolerance. Autoimmunity. Primary immunodeficiencies. AIDS. Amyloidosis. Haemodynamic disorders. Oedema. Embolism. Thrombosis. Shock. Neoplasia. Definition, benign/malignant tumours. Tumour nomenclature, aetiology of tumours. Genes involved in neoplastic process. Familial syndromes. Chemical, radiation and microbial carcinogenesis. Tumour immunity. Effect of tumour on host. Paraneoplastic syndromes. Intracellular accumulations. Pathologic calcification. Intracellular accumulations of protein. Lipids, glycogen and pigments. Infectious diseases. Malaria. Tuberculosis. Leprosy. Schistosomiasis. Syphilis. Amoebiasis. Typhoid. Onchocerciasis.

PAT 306: Pathology practical I (1 Unit C: PH 45)

Learning Outcomes

At the end of this course, students should be able to:
1. apply autopsy-indications, types and procedure;
2. identify museum pots and describe museum pots;
3. diagnose museum pots; and
4. apply histopathology-tissue processing, use of microscope, identification and diagnosis of common lesions.

Course Contents

Identification, description and diagnoses of museum specimens. Microscopy, histology slide-interpretation. Description and diagnoses of selected diseases. Tissue processing. Museum techniques. Post-mortem.

PCL 302: Introductory Pharmacology (3 Units C: LH 45)

Learning Outcomes

At the end of this course, students should be able to:
1. illustrate the history of pharmacology;
2. outline branches of pharmacology and their relevance to health professions and the drug industry;
3. enumerate sources of obtaining drug information and the origins of drugs;
4. list the various routes of drug administration, biological membranes crosses and transport mechanisms involved;
5. outline the components of pharmacokinetics and their influencing factors;
6. describe body compartments and their fluid volumes and drug binding sites;
7. explain the liver microsomal mixed function oxidase system, its phases and types of reactions and how drugs can induce/inhibit their activity;

8. outline the major routes of drug elimination and termination effects;
9. explain what first-pass effect is and mode of drug action;
10. discuss dose-effect relation of drugs including effects of the different ligand types and measurements of therapeutic index;
11. describe adverse drug reactions, dose-related, acute and chronic overdosage;
12. illustrate drug abuse and dependence, and the central mechanism of action of major drugs of abuse;
13. enumerate the signs and symptoms of overdose and withdrawal effects of major drugs of abuse, alcohol, opioids and benzodiazepines; and
14. explain the pharmacotherapeutic options and their relative benefits/side effects.

Course Contents

Definition, historical concepts and the development of modern pharmacology, therapeutics, clinical pharmacology and toxicology. Pharmacology in relation to the health professions. Medicine, pharmacy, dentistry, nursing. The role of pharmacology in the drug industry. Drug development, evaluation and control. Role of pharmacology in public health, social and preventive medicine. Information source. How to search for drug information, use of reference and cross–reference, book index, journals, list of useful reference books. Origin/source of drugs. Routes of administration of drugs. Biological membranes and transport of drugs, drug-body interaction. Pharmacokinetics, absorption, distribution, metabolism and elimination of drugs. Absorption and influencing factors. Drug distribution in the body compartment and fluid volumes, binding to plasma proteins, tissues and organs; passage into the CNS, passage across placenta. Biotransformation. Chemical pathways of drug metabolism, sites of biotransformation, liver microsomal mixed function oxidase system, Phase I and Phase II reactions, types of phases I, types of phase II reactions (glucuronidation, acetylation, glycine conjugation), inhibition, depression and induction of enzymes. Major routes of drug elimination and termination of effects (renal, biliary and faecal excretion), other minor routes (lungs, skin). Rates of drug absorption and elimination, measurements of clearance and apparent volume of distribution, factors influencing clearance and distribution, bioavailability, half-life, first pass effect. Use of pharmacokinetics in designing dosage regimes. Loading dose, maintenance dose. Clinical relevance of drug metabolism. Individual differences, drug-drug interactions, interaction between drugs and endogenous compounds. Factors affecting pharmacokinetics processes, disease, feeding status, age, sex. Pharmacodynamics. Mode of action of drugs. Molecular mechanism of drug action, drug receptor interactions, drugs acting on enzyme systems, non-specific interaction of drugs with living systems. Dose-effect relation of drugs. Dose-response curve, concentration-effect curve, potency, efficacy, therapeutic index, biological assay, effective dose (ED50), toxic dose (LD50), lethal dose (LD50), receptor binding of agonists and antagonists, competitive and non-competitive antagonists, partial agonist, receptor-effector coupling, spare receptors, other antagonism, chemical and physiological. Variability in individual response. Idiosyncrasy, pharmacogenetics, hypo-and hyper-reactivity, hypersensitivity, tolerance, tachyphylaxis. Adverse drug reactions, dose-related drug toxicity, acute and chronic over dosage. Drug dependence and addiction, underlying biological basis of addiction as a disease, differential diagnostic criteria for drug abuse vs. dependence and their differences, mechanism of action within the CNS of major drugs of abuse. Signs and symptoms of overdose caused by major drugs of abuse (including alcohol, opioids and benzodiazepines), signs and symptoms of opioid withdrawal, pharmacotherapeutic options for treatment of opioid abuse and dependence and their relative benefits and side effects; pharmacotherapeutic options for treatment of alcohol abuse and their relative benefits and side effects. Drug discovery and clinical trials, phases of clinical trials. Differences between single and double-blind designs for clinical trials. Definition of IND and NDA. Ways in which a clinical drug study is evaluated.

PCL 304: Autonomic Pharmacology (3 Units C: LH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the anatomy of the ANS and its two divisions;
2. outline the major neurotransmitters involved in each division of the ANS, synthesis of the neurotransmitters;
3. list sympathetic and parasympathetic effects;
4. describe the physiological and pathophysiological role of 5HT and histamine;
5. outline the mechanism of release of 5HT and histamine;
6. explain the various types and subtypes of receptors, with examples of antagonists;
7. discuss basic and clinical pharmacology of antagonists at the 5HT-and histamine receptors;
8. describe other autacoids;
9. list the various modes of action of drugs and explain dose-effect relation of drugs; and
10. explain concept of variability in individual response to drugs.

Course Contents

Review of autonomic nervous system anatomy, sympathetic (thoracolumbar) and parasympathetic (craniosacral) divisions. Review of neurohumoral transmission. Neurotransmitters of the ANS, cholinergic and adrenergic transmission–evidence for acetylcholine and noradrenaline, synthesis of the neurotransmitters. Parasympathetic system, cholinergic receptors, muscarinic and nicotinic stimulants, uses, pharmacodynamics, SAR, organ system effects. Indirectly acting cholinergic stimulants-anticholinesterases, chemistry and pharmacokinetics. Clinical pharmacology of cholinergic stimulants. Cholinergic receptor antagonists–muscarinic and nicotinic, chemistry, pharmacokinetics and pharmacodynamics of atropine and related drugs, organ system effects (CNS, eye, CVS, respiratory system, GIT, Genito–urinary tract and sweat glands), including their clinical pharmacology. Basic and clinical pharmacology of ganglion blockers. Somatic motor nerves. Neuromuscular junction transmission, effect of drugs, end–plate nicotinic receptor and neuromuscular blockers, types of blockers and their interaction with anti-cholinesterase, lack of Pseudo-cholinesterase and anaesthesia. Sympathetic system, basic pharmacology of adrenergic receptor stimulants. Identification of adrenergic receptors, molecular mechanisms of adrenergic action, chemistry, pharmacokinetics and pharmacodynamics of sympathomimetic drugs. Organ system effects. CVS, blood vessels, heart, blood pressure, eye, respiratory tract, exocrine glands, metabolic effects on endocrine function (use of noradrenaline, adrenaline, isoprenaline dopamine, dobutamine, salbutamol, fenoterol, terbutaline, phenylephrine, ephedrine and amphetamine as examples). Direct and indirect acting sympathomimetics such as tyramine. Clinical pharmacology of adrenergic receptor acting drugs. Cardiovascular application, condition in which blood flow or blood pressure is to be enhanced, hypotension, shock, carcinogenic shock, condition in which the blood flow is to be reduced, hypertension, and cardiac applications, paroxysmal atrial tachycardia, complete heart block and cardiac arrest, congestive heart failure. Respiratory application, Bronchitis, bronchial asthma. Anaphylaxis, Ophthalmic, genitourinary, use of β2 antagonists (terbutaline, ritodrine, salbutamol) to suppress premature labour. CNS applications Toxicity of sympathomimetics. Adrenergic receptor blocking drugs - Alpha receptor blockers, types (reversible and irreversible), receptor–selective antagonists (phenoxybenzamine, phentolamine, yohimbine, prazosin, indoramin, idazoxan), pharmacological effects (cardiovascular and others), Beta-receptor blockers, types, B1- and B2-specificity (propranolol, metoprolol, timolol, atenolol, pindolol, labetalol), pharmacokinetics, (absorption, bioavailability, distribution and clearance), pharmacodynamics (CVS, respiratory tract, eyes, metabolic and endocrine effects), effects unrelated to beta receptor blockade. Clinical pharmacology of alpha- and beta-receptor blockers. Application of alpha-blockers, phaeochromocytoma, hypertensive emergencies and hypertensive chronic treatment,

peripheral vascular disease and local vasoconstrictor excess. Application of beta-blockers, hypertension, ischaemic heart disease, cardiac arrhythmias, other cardiovascular disorders, glaucoma, hyperthyroidism, neurological disease (migraine headache, tremors, anxiety, alcohol withdrawal); choice of beta blockers, clinical toxicity. Autacoids, Histamine and its antagonists. Physiological and pathophysiological role of histamine, pharmacology of histamine receptors, mechanism of histamine release, H1-antagonists (ethanolamine, ethylenediamines, phenothiazines), H2-antagonists (burimamide, metiamide, cimetidine.), H3-antagonists (bronchioles, methylhistamine), basic pharmacology, chemistry, pharmacokinetics and pharmacodynamics, clinical pharmacology. 5HT and its antagonists. Methysergide. Cyproheptadine, cyclooxygenase inhibitors, vasoactive polypeptides, vasopressin, angiotensin, kinins, kallikrein, substance P, prostaglandins, leukotrienes, cyclic nucleotides and other mediators.

PCL 306: Cardiovascular Pharmacology (3 Units C: LH 30; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe electrophysiology of normal cardiac rhythms and mechanism of arrhythmias;
2. enumerate the classes of drugs used in management, with specific drug examples;
3. list basic and clinical pharmacology of drugs used in management;
4. explain pathophysiology of HTN, therapeutic implications and diagnosis;
5. list the basic and clinical pharmacology of the various classes of antihypertensive agents; and
6. describe specific examples of each class of antihypertensive agent.

Course Contents

Hypertension and blood pressure regulation. Aetiology of hypertension. Normal regulation of blood pressure. Postural baroreflex. Renal response to decreased blood pressure, therapeutic implications, diagnosis. Basic pharmacology of antihypertensive drugs in relation to mechanism and site of action, haemodynamic effects, dosage, pharmacokinetics and toxicity, diuretics, sympatholytic drugs, direct vasodilator, and drugs that block production or action of angiotensin. Angina pectoris and anti-anginal Drugs. Pathophysiology of angina, determinants of coronary blood flow and myocardial oxygen supply, specific therapeutic interventions (nitrates, beta blockers, calcium entry blockers). Basic and Clinical pharmacology of anti-anginal drugs. Historical concepts, chemistry, pharmacokinetics, pharmacodynamics, toxicity and tachyphylaxis. Congestive heart failure and Drugs used in Management, pathophysiology of heart failure, pathophysiology of cardiac performance, pathophysiology of the peripheral vasculature in congestive heart failure. Basic and clinical pharmacology of drugs used in congestive heart failure (cardiac glycosides and others like amrinone and beta-adrenergic stimulants), Administration, dosage, interactions, other clinical uses, toxicity, chemistry, pharmacokinetics, pharmacodynamics (mechanical and electrical effects). Cardiac arrhythmias and anti-arrhythmic drugs, electrophysiology of normal cardiac rhythm, mechanisms of arrhythmias. Basic and clinical pharmacology of anti-arrhythmic drugs, classes and types, mechanism of action, specific drugs, pharmacokinetics, pharmacodynamics and extracardiac effects, principles of anti-arrhythmia. Diuretics, renal tubule transport mechanism. Proximal and distal tubules, loop of Henle and collecting ducts. Basic and clinical pharmacology -types (carbonic anhydrase inhibitors, thiazides, loop diuretics, potassium-sparing (aldosterone antagonist), chemistry, pharmacokinetics, pharmacodynamics, clinical indications, dosage, toxicity, contraindications, combination therapy. Drugs that affect water excretion. Mannitol. Clinical pharmacology of diuretics - Oedematous state (CHF, hepatic cirrhosis, nephritic syndrome) non-oedematous states (hypertension, renal potassium wasting), alteration of urinary pH, tract infections, renal failure immunity, immunosuppressive drugs. Drugs used in

hyperlipidaemic conditions, Pathophysiology of hyperlipoproteinemia, Normal lipoprotein metabolism review, the hyperlipoproteinemic states (primary hypertriglyceridemia, primary hypercholesterolaemia, deficiency of high-density lipoproteins, secondary hyperlipoproteinemia). Role of elevated serum LDL concentrations in promoting risk of developing cardiovascular disease, protective role of increased serum HDL concentration in decreasing risk, presently accepted values for desirable LDL, HDL and triglyceride concentrations in normal individuals, treatment goals for individuals with hyperlipidaemia. Role of diet and lifestyle, pharmacology of specific drugs used (nicotinic acid, clofibrate, gemfrozil, bile acid-binding resins, sitosterols, neomycin, HMG-CoA reductase inhibitors, dextrothyroxine, probucol), drug combinations. Drugs Acting on blood. Cytopenia and Drugs used in treatment anaemias. Iron deficiency and other hypochromic anaemias, megaloblastic anaemia, basic pharmacology of drugs used in management, iron, cobalamins (B12), folates. Basic pharmacology, clinical indication, mechanism of action, adverse effects and contraindications of the growth factors used in management of cytopenia, including, erythropoietin, G-CSF, GM-CSF and IL-II. thrombosis and thrombolytics, principles of blood coagulation, plasma coagulation factors, regulation of coagulation and fibrinolysis. Basic pharmacology of drugs used to treat thrombosis, types of anti-coagulants (heparin and low molecular weight heparins, coumarins, indandiones), chemistry, pharmacokinetics, mechanism of action, administration and dosage, role of aPTT in heparin monitoring, concept of using INR in management of warfarin therapy. Platelet aggregation inhibitors, drugs that inhibit platelet function, aspirin and related cyclooxygenase inhibitors, imidazole, sulphinpyrazone. Drugs used in bleeding disorders. Vitamin K. Factor VIII. Factor IX. Fibrinogen. Fibrinolysis inhibitors (aminocaproic acid, tranexamic acid).

MIC 302: Introductory Microbiology and General Bacteriology (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. identify and differentiate various organisms of medical importance;
2. describe the different levels of interaction between the host, environment and pathogens;
3. define normal body flora and roles in health and disease;
4. discuss collection, transportation and processing of clinical specimens;
5. describe the pathogenesis and clinical manifestations of infectious agents;
6. apply the knowledge of medical microbiology in management of patients; and
7. control infections in the hospital and community.

Course Contents
Infectious disease, past and present. Mode of transmission of infectious disease. Nature and classification of bacteria of medical importance. Mechanisms of pathogenicity and virulence. Microbial metabolism and multiplication. Specification defence mechanisms against bacteria. Exotoxin-producing bacteria. The process of bacterial destruction (sterilisation and disinfection). The normal flora of the human body. Description and identification of the following organism, Salmonella typhii, Shigella spp, Mycobacterium spp, Brucella spp, Corynebacterium spp, Clostridium spp, Spirochaetes, Listeria, Yersinia spp, Vibrios, Campylobacterium spp, Enterobacterium, Acinetobacterium spp, Pseudomonas spp, Actinomyces and Nocardia Chlamydia, Mycoplasma and Rickettsia spp.

MIC 304: General Parasitology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:

1. define taxonomy of parasites;
2. outline historical development of medical protozoology;
3. describe development of medical helminthology;
4. classify Helminthes; and
5. explain general properties of Helminthes.

Course Contents
Taxonomy of parasites. Historical development of medical protozoology. Development of medical helminthology. Classification of Helminthes. General properties of Helminthes.

MIC 306: General Virology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list basic properties of viruses;
2. classify viruses;
3. discuss development and cultivation of medically important viruses; and
4. describe host immune response against viruses.

Course Contents
Basic properties and classification of viruses. Development and cultivation of medically important viruses. Host immune response against viruses.

MIC 308: General Mycology (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define mycology;
2. explain medical mycology;
3. describe the nature of medically important fungi;
4. classify medically important fungi; and
5. discuss mode of reproduction of fungi.

Course Contents
Introduction to medical mycology. Nature and classification of medically important fungi. Mode of reproduction of fungi.

CPY 302: Introduction to Chemical Pathology (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain biological variability and the effects of patient preparation prior to sample collection in order to enable students send suitable samples to the laboratory;
2. describe sample collection, random samples, timed collection, and use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples;
3. interpret clinical chemistry results, use of conversion factors for different units and reference intervals;
4. describe acid base homeostasis and disorders, sodium and water homeostasis and disorders, potassium homeostasis and disorders, calcium homeostasis and related disorders, uric acid metabolism and disorders;
5. enumerate potassium balance and disorders; and

6. list calcium, phosphate, magnesium and vitamin D disorders.

Course Contents
General clinical chemistry. General introduction to chemical pathology, branches of chemical pathology, the role of chemical pathology in the diagnosis, monitoring, detection of complication and determination of diseases, burden of non-communicable diseases, importance of reference interval/range, Gaussian distribution, normal distribution curve. Specimen handling and pre-analytical variables. Biological variability. Concept of diurnal rhythm, supracardian rhythm, modifiable and non-modifiable causes of analytical variability, and types of specimens collected and analysed by the chemical pathology laboratory. Patient preparation for chemical pathology investigations, random samples, timed collection, and use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples. Interpretation of numerical results. Units in clinical chemistry, SI and conventional units, interpreting clinical chemistry result, use of population specific reference interval, subject base reference interval, significant differences in results, sensitivity, specificity, diagnostic efficiency and odd's ratio, negative and positive predictive values, handling and abnormal or incongruent laboratory result. Acid base homeostasis and disorders, sodium and water homeostasis and disorders, potassium homeostasis and disorders, calcium homeostasis and related disorders, uric acid metabolism and disorders. Water and sodium homeostasis and disorders. Potassium balance and disorders. Calcium, phosphate, magnesium and vitamin D disorders.

CPY 304: Immunology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define basic concepts in immunology;
2. describe immunology of common infectious diseases;
3. list hypersensitivity reactions;
4. describe autoimmune diseases; and
5. list immunodeficiency conditions.

Course Contents
Basic concepts in immunology. Immunology of common infectious diseases (Malaria, TB, HIV). Hypersensitivity reactions. Autoimmune diseases. Immunodeficiency states.

CPY 306: Clinical Chemistry of Disease I (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. interpret clinical chemistry results;
2. illustrate use of conversion factors for different units and reference intervals;
3. describe the application of conversion factors for different units and reference intervals;
4. explain sample collection, random samples, timed collection; and
5. discuss use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples.

Course Contents
Blood glucose homeostasis. Glucose tolerance tests, performance and interpretation, diabetes mellitus. Formation of free fatty acid, ketone bodies and lactate. Plasma lipids, cholesterol, triglycerides, phospholipids and non-esterified fatty acids. Plasma lipoproteins and causes of hyper and hypolipoproteinaemia. Concept of risk factors for diseases and significance in

prevention. Plasma proteins, reference values, separation of fractions and variations in health and disease. Paraproteinaemias. Bence-Jones proteinuria and significance. Renal function, dysfunction and investigations. Definitions, causes and consequences of azotaemia, uraemia, creatinine clearance. Liver function, dysfunction and investigations. Biochemical assessment of hepatic function, jaundice, hepatocellular, haemolytic and obstructive.

HAE 302: General Haematology I (4 Units C: LH 30; PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. define haematology;
2. describe the general concept, organisation and various stages of blood cell formation;
3. list the types and roles of growth factors involved in haematopoiesis;
4. explain the mechanism of control of haemoglobin synthesis;
5. enumerate the sites of haematopoiesis and types of haemoglobins produced in both prenatal and post-natal life;
6. state the regulation and stages of haematopoiesis;
7. describe the normal ranges of routine haematological parameters;
8. describe red blood cell indices and their correlation with red cell morphology;
9. classify anaemias and give differential diagnoses based on morphology and red cell indices;
10. explain leucocytosis/leucopenia and thrombocytosis/thrombocytopenia and their causes and mechanisms;
11. illustrate how to evaluate patients coming with quantitative blood abnormalities;
12. list common red cell shape, size and inclusion abnormalities;
13. describe various white blood cell nuclear and inclusion abnormalities;
14. enumerate platelet size and functional abnormalities;
15. discuss various clinical conditions associated with qualitative blood cell abnormalities;
16. list common causes of lymphadenopathy and splenomegaly;
17. differentiate and clinically evaluate patients with lymphadenopathy and splenomegaly; and
18. demonstrate knowledge of hyposplenism.

Course Contents

Blood cell formation and regulation. Erythropoiesis, myelopoiesis, lymphopoiesis and thrombopoiesis. Growth factors in haematopoiesis. Genetic control of haemoglobin synthesis. Sites of haematopoiesis in the foetus and in adult life. Types of prenatal and postnatal haemoglobins. Normal haematological values, red cell count, HB concentration, Haematocrit. Red cell indices. MCV, MCH, MCHC, correlation with red cell morphology/ morphological classification of anaemia. White cell count, differentials and absolute counts, platelet count. Quantitative blood cell abnormalities, anaemia vs polycythaemia, causes/mechanism/clinical/evaluation. Leucocytosis/leucopoenia causes/mechanism/clinical evaluation. Thrombocytosis Vs thrombocytopaenia, causes/ mechanism/clinical evaluation. Qualitative blood cell Abnormalities. Revise normal structure and functions of red blood cells, leucocytes and platelets. Red cell shape abnormalities. Red cell size abnormalities. Red cell inclusions. White cell nuclear abnormalities. White cell cytoplasmic inclusions and abnormalities. Platelet size abnormalities. Lymphadenopathy-causes/characterisation/clinical evaluation. Splenomegaly, hypersplenism, hyperreactive, malarial, splenomegaly, causes, characterisation, clinical evaluation. Hyposplenism and splenectomy. Causes, characterisation, clinical, evaluation. Causes of functional asplenia/hyposplenism and surgical splenectomy. Precautions and treatment.

COM 302: Introduction to Demography and Vital Statistics (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. list sources of population data, national census;
2. explain population dynamics, structure and growth;
3. define demographic characteristics;
4. list sources of health data and vital statistics;
5. explain measurement of health and disease;
6. describe measurement of fertility and mortality
7. discuss standardisation of vital rates; and
8. explain interaction between medical action, health and population growth.

Course Contents

Sources of population data. National census. Population dynamics. Structure and growth. Demographic characteristics. Sources of health data and vital statistics (definition). Measurement of health and disease. Measurement of fertility and mortality. Standardisation of vital rates. Interaction between medical action, population, health and population growth. Collection, organisation and presentation of health debate.

COM 304: Introduction to Environmental Health (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe human environment in its totality;
2. outline components of the environment;
3. explain human environment and health, natural disaster;
4. list sources of water, purification and examination of water;
5. enumerate refuse, types and disposal management;
6. define housing and health;
7. describe market and factory sanitation; and
8. define vector control.

Course Contents

Human environment in its totality. Components of the environment. Human environment and health natural disaster. Sources of water, purification and examination of water. Refuse, types and disposal Management. Housing and Health. Market and factory sanitation. Vector control.

COM 306: Introduction to Occupational Health (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe development and history of occupational health;
2. explain working environment and health;
3. enumerate occupational health practice and services;
4. discuss occupational health problems in Nigeria;
5. explain control of occupational health problems, occupational safety and hygiene;
6. enumerate the health problems of agricultural workers in Nigeria, occupational lung diseases, skin diseases;
7. estimate occupational and environmental health risks;
8. discuss national and international regulations relating to occupational health; and
9. explain Workman's compensation Act.

Course Contents
Definition, development and history of occupational health. Working environment and health. Occupational health practice and services. Occupational health problems in Nigeria and their control (occupational safety and hygiene). The health problems of agricultural workers in Nigeria. Occupational lung diseases, skin diseases. Estimating occupational and environmental health risks. National and international regulations relating to occupational health. Workman's compensation Act.

COM 308: Introduction to General Epidemiology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define epidemiology, epidemiology types and list uses of epidemiology;
2. describe epidemiology, persons, place and time;
3. enumerate epidemiological methods;
4. explain investigation of epidemics;
5. describe screening in disease control; and
6. list principles of control of communicable and non-communicable diseases.

Course Contents
Definition of epidemiology and epidemiology types. Uses of epidemiology. Descriptive epidemiology, persons, place and time. Epidemiological methods. Investigation of epidemics. Screening in disease control. Principles of control of communicable and non-communicable diseases.

COM 310: Community Diagnosis and Research Methods (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe community entry and advocacy, sensitisation and mobilisation;
2. explain community recognisance, mapping and identification of community resources;
3. define house numbering;
4. explain design and use of survey instruments for community diagnosis;
5. enumerate data collection methods and tools;
6. describe data analysis, interpretation and write-up;
7. design intervention, health programmes;
8. discuss with community stakeholders for health programme intervention and prioritisation;
9. recommend plan of action and follow-up and disseminate results;
10. identify health research topic for execution through prioritisation of health problems;
11. write a research proposal and conduct a literature review on the research topic;
12. discuss aim and objectives of the research, research methods, research instruments;
13. discuss ethical considerations; and
14. conduct a research.

Course Contents
Community diagnosis, community entry and advocacy. Community sensitisation and mobilisation. Community recognisance and community mapping and identification of community resources. House numbering, design and use of survey instruments for community diagnosis. Data collection methods and tools, data analysis, interpretation and write-up, plan for intervention, health programmes. Discussion with community, stakeholders for health programme intervention and prioritisation. Recommendation for plan of action and follow-up, dissemination of results. Research methods. Definition and types, identification of health

research topic for execution through prioritisation of identified health problems. Writing a research proposal, conducting a literature review on the research topic, aim and objective of the research, research methods. Research instruments, ethical considerations, limitation to research being undertaken, data collection, management, analysis and presentation. Results and discussion, conclusions and recommendations, literature citation, appendices.

COM 312: Field Posting and Community Diagnosis (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. explain availability of adequate resources for the field posting, logistics support;
2. acquire supervision by faculty staff and other supporting staff in the department;
3. identify posting site and cooperation of the people in the community for study; and
4. discuss assessment of each student during and at the end of the field work.

Course Contents
Adequate Resources availability for the field posting. Logistics support. Supervision by faculty staff and other supporting staff in the department. Choice of posting site and cooperation of the people in the community for study. Evaluation of each student during and at the end of the field work.

400 Level

PAT 401: Systemic Pathology I (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of hypertension, atherosclerosis, ischemic heart disease (angina pectoris, myocardial infarction), valvular heart disease, cardiomyopathies, congenital heart disease, pericarditis, heart failure, hypertensive heart disease, cardiac tumours;
2. explain epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of COLDs, restrictive lung disease (pneumoconiosis, hypersensitivity pneumonitis, sarcoidosis, idiopathic pulmonary fibrosis), pneumonia, PTB, respiratory distress syndromes (neonatal/adult), pulmonary embolism and hypertension, respiratory failure, lung tumours, upper respiratory infections (common cold, pharyngitis, croup, epiglottitis, otitis media); and
3. discuss epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of retinoblastoma, neuroblastoma, nephroblastoma, medulloblastoma, Burkitt's lymphoma, embryonal rhabdomyosarcoma.

Course Contents
Cardiovascular system. Hypertension. Atherosclerosis. Ischaemic heart disease. Hypertensive heart disease. Valvular heart disease. Heart failure. Cardiomyopathies. Congenital heart disease. Pericarditis. Cardiac tumours. Lymphoreticular system. Acute and chronic lymphadenitis. Lymphoid hyperplasia. Lymphomas. Hyperimmune. Malaria. Splenomegaly syndrome. Other causes of splenomegaly. Respiratory System. COLDs. Restrictive lung disease (pneumoconiosis, hypersensitivity pneumonitis, sarcoidosis, idiopathic pulmonary fibrosis). Tuberculosis. Pneumonia. Respiratory distress syndromes (neonatal/adult). Pulmonary embolism. Pulmonary hypertension. Respiratory failure. Lung tumours. Upper respiratory infections (common cold, pharyngitis, croup, epiglottitis, otitis media). Childhood malignancies. Retinoblastoma. Neuroblastoma. Nephroblastoma. Medulloblastoma, Burkitt's

lymphoma. Embryonal rhabdomyosarcoma. GIT system. Oral cancer. Dental caries. Sialoadenitis. Salivary gland tumours. Tracheo-oesophageal fistula. Achalasia cardia. Hiatus Hernia. Oesophagitis. Oesophageal cancer. Gastritis. Peptic ulcer. Hypertrophic gastropathy. Gastric cancer. Malabsorption. Inflammatory bowel disease. Hirschprung disease. Appendicitis. Intestinal polyps. Colorectal cancer. Hepatobiliary/Pancreas. Hepatitis, yellow fever. Lassa fever. Alcoholic liver disease. Metabolic liver disease. Cirrhosis. Liver tumours. Primary biliary cirrhosis. Sclerosing cholangitis. Cholelithiasis. Cholecystitis. Pancreatitis. Pancreatic tumours. Endocrine System. Diabetes mellitus. Islet tumours of the pancreas. Hyperthyroidism. Hypothyroidism. Thyroiditis. Thyroid tumours. Multiple endocrine neoplasia (MEN). Pituitary and adrenal disorders.

PAT 403: Pathology practical II (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. apply autopsy-indications, types and procedure;
2. identify museum pots;
3. describe museum pots;
4. diagnose museum pots; and
5. apply histopathology-tissue processing, use of microscope, identification and diagnosis of common lesions.

Course Contents

Identification. Description and diagnoses of museum specimens. Microscopy. Histology slide-interpretation. Description and diagnoses of selected diseases. Tissue processing. Museum techniques. Post-mortem.

PCL 401: GIT Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe pathophysiology of nausea and vomiting;
2. explain the basic and clinical pharmacology of the different classes of antiemetics, with specific examples;
3. list the common causes of constipation;
4. explain the basic pharmacology of drugs used to provide relief of constipation;
5. enumerate non-specific antidiarrhoeal drugs, lactulose;
6. describe pathophysiology of peptic ulcer disease;
7. list drugs that control gastric acid secretion and treat peptic ulcers;
8. list drugs to treat inflammatory bowel disease (IBD); and
9. enumerate anti-IBD therapies.

Course Contents

Drugs acting on the alimentary system, nausea and vomiting, pathophysiology, basic pharmacology of antiemetics, dopamine-receptor antagonists (metoclopramide, prochlorperazine, haloperidol). Antihistamines, serotonin antagonists, anticholinergics, benzodiazepines, corticosteroids. Constipation, common causes, basic pharmacology of drugs used for relief (bulk, osmotic and stimulant laxatives, saline and magnesium laxatives, detergent laxatives, non-absorbable sugars, polyethylene glycol, lubricants, enemas). Non-specific antidiarrhoeal drugs. Lactulose ulcer healing drugs. Drug management. H2-receptor antagonists. Antacids. Proton-pump inhibitors. Triple therapy.

PCL 403: Respiratory Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define the pathophysiology and types of asthma;
2. enumerate the various classes of anti-asthmatics, with specific examples;
3. explain the basic pharmacology of the classes of drugs;
4. discuss the clinical pharmacology of the drugs with regards to rapidity of onset of actions and preference of certain drugs in certain situations;
5. distinguish which drug classes are bronchodilators and which are anti-inflammatory;
6. explain the use of oxygen therapy in management of asthma;
7. list advantages of inhalational therapy in management of asthma;
8. describe the cough reflex, the common causes of cough and the types of coughs;
9. discuss the classes of drugs used in management of cough, with examples; and
10. explain the basic pharmacology of drugs used in management of cough.

Course Contents

Drugs acting on the respiratory system. Asthma and anti-asthmatics. Pathophysiology. Types (chronic asthma, status asthmaticus), classes of anti-asthmatics (B2-adrenergic agonists, methylxanthines, muscarinic receptor antagonists, adrenal corticosteroids, cromolyn, leukotriene modulators, monoclonal antibodies). Basic pharmacology of anti-asthmatic drugs. bronchodilator drugs and anti-inflammatory drugs. Oxygen therapy. Advantages of inhalational therapy in management of asthma. Mechanism of action, adverse effects, contraindications, pharmacokinetics, rapidity of onset of actions, preference of certain drugs in certain situations bronchodilator drugs. Drug-induced pulmonary disorders. Cough. Antitussives. Expectorants. Mucolytics. Respiratory stimulants.

PCL 405: Clinical Pharmacology and Therapeutics (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define ADR, types, classes inherent and acquired anomalies;
2. describe the basic mechanisms and consequences of drug-drug interactions;
3. define the approaches to treatment of ADRs;
4. explain clinical importance of ADRs in relation to embryonic and foetal pharmacology;
5. enumerate drugs that cause teratogenic effects;
6. explain the concept of altered drug response in infants and children, and influence on paediatric drug dosing; and
7. discuss the concept of altered drug response in the elderly, and influence on geriatric drug dosing.

Course Contents

Clinical pharmacology general aspect. Evaluation of drug therapy, clinical aspects of adverse drug reaction (inherent anomalies, acquired anomalies, treatment of adverse reactions). Basic mechanisms of drug-drug interactions. Consequences of drug-drug interactions. Clinically important drug interactions, beneficial embryonic and foetal clinical pharmacology, drug use in pregnancy, teratogenicity. Paediatric clinical pharmacology and therapeutics. Altered drug response in infants and response in infants and children, drug dosage in paediatrics. Geriatric clinical pharmacology and therapeutics. Altered drug response in the elderly drug dosage in geriatrics.

HAE 401: General Haematology II: Anaemias (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. define iron metabolism;
2. enumerate causes, manifestations, diagnosis and treatment of IDA;
3. list the causes, manifestations and treatment of iron overload;
4. describe metabolism of folates and vitamin B12;
5. enumerate the causes, clinical manifestations, laboratory features and treatment of megaloblastic anaemia;
6. discuss the aetiology, manifestations, lab findings and differential diagnoses of AA;
7. differentiate myeloblastic and leucoerythroblastic anaemias;
8. describe the aetiology, pathogenesis, laboratory findings and treatment of anaemia of chronic disorders;
9. classify haemolytic anaemia;
10. discuss the pathophysiology, clinical and laboratory evaluation of haemolytic anaemia;
11. describe the spectrum of haemoglobin disorders;
12. explain sickle cell diseases including their inheritance patterns, molecular genetics, pathophysiology, clinical and laboratory features, complications, prevention and treatment;
13. explain thalassaemias, genetic counselling and antenatal diagnosis of globin disorders;
14. describe the pathology, clinical and lab findings of common red cell membranopathies; and
15. discuss the pathology, genetics, clinical and lab findings of common red cell enzymopathies.

Course Contents

Iron sources, absorption, transportation, storage and metabolism. Deficiency anaemia. Iron overload, haemosiderosis/haemochromatosis. Megaloblastic anaemias. Sources, absorption, transportation and storage of folates and vitamin B12. Folate deficiency. Vitamin B12 deficiency, clinical features, laboratory findings, diagnosis and treatment. Aplastic anaemia, myelopathic anaemia and leucoerythroblastic anaemia. Anaemia of chronic diseases. Chronic infections. Chronic inflammation. Clinical and laboratory features. Differential diagnoses. General aspects of haemolytic anaemias. Definition, types. Intravascular and extravascular haemolysis and their clinical and biochemical features. Inherited vs acquired. Haemoglobinopathies. Sickle cell diseases, thalassemia, genetic counselling, antenatal diagnosis of haemoglobinopathies. Red cell membranopathies, Spherocytosis, elliptocytosis, stomatocytosis. Others. Red cell enzymopathies. G6PD deficiency, pyruvate kinase deficiency. Acquired haemolytic anaemias, auto immune. Warm/cold. Microangiopathy. Mechanical contact anaemia. Red cell infections-malaria.

HAE 403: Haemato-Oncology and Bleeding Disorders (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the pathophysiology, clinical presentations, laboratory features and treatment principles of the acute leukaemia;
2. discuss the pathophysiology, clinical presentations, laboratory features and treatment principles of the chronic leukaemia;
3. describe the spectrum, pathophysiology, clinical presentations, laboratory features and treatment principles of the non-leukemic MPDs;
4. define the pathology of PNH and MDS;

5. explain the epidemiology, aetiopathogenesis, morphology, clinical features, investigations, staging and treatment of the lymphomas;
6. describe the aetiopathogenesis clinical features, investigations, treatment and complications of MM and related disorders;
7. demonstrate competence in enumeration of the differential diagnoses of lymphadenopathy in HIV infection;
8. enumerate the concept and steps involved in primary and secondary haemostasis;
9. describe the principles behind, and clinical utility of simple tests of haemostasis;
10. explain the clinical pattern of bleeding in platelet disorders, as compared to coagulation factor deficiency bleeding;
11. discuss the aetiology, pathogenesis, clinical manifestations, laboratory findings and treatment of ITP;
12. demonstrate competence in enumerating other causes of platelet-related bleeding;
13. describe the spectrum of inherited coagulation factor deficiencies and related bleeding disorders;
14. illustrate the spectrum of acquired bleeding disorders;
15. describe the aetiology, pathogenesis, clinical presentation, laboratory features and treatment of DIC;
16. discuss the mechanisms, clotting abnormalities, and treatment of haemorrhagic disease of the newborn and CLD;
17. explain the principles of anticoagulant therapy and monitoring;
18. list the characteristics of the antigens and antibodies to ABO and Rh blood group systems;
19. discuss the aetiopathogenesis, manifestations, investigations and treatment of HDFN due to ABO and Rh incompatibilities; and
20. explain the general principles of ABO/Rh blood grouping and cross-matching.

Course Contents

Acute leukaemia myeloblastic (AML), lymphoblastic (ALL), clinical presentation, laboratory findings and treatment. Chronic leukaemias myeloid (CML), lymphocytic (CLL), clinical presentation, laboratory findings and treatment. Non-Leukemic myeloproliferative disorders. Polycythaemia rubra vera, myelofibrosis, essential thrombocythemia. The lymphomas, hodgkin (HL), non-Hodgkin's (NHL), Burkitt's (BL) clinical presentation, laboratory findings and treatment. Multiple myeloma clinical presentation, laboratory findings and treatment. Miscellaneous disorders, paroxysmal nocturnal haemoglobinuria, myelodysplastic syndrome. HIV Infection and Haematological manifestations. Clinical staging of HIV infection, anaemia in HIV infection, leucopaenia in HIV Infection, thrombocytopenia in HIV Infection. clotting profile abnormalities in HIV. Differential diagnoses of lymphadenopathy in HIV Infection. Haemostasis and thrombosis. Normal haemostasis, coagulation cascade, fibrinolysis, tests of haemostasis, bleeding time, PT/PTTK/TT, fibrinogen assay and titre, FDP/D-dimer. Platelet disorders. General pattern of bleeding in platelet disorders, idiopathic thrombocytopenia, other causes of platelet-related bleeding including drugs. Inherited bleeding disorders. Haemophilias, inheritance pattern, clinical presentation, laboratory investigations and treatment. Von Willebrand's disease. Acquired bleeding disorders, liver diseases, disseminated intravascular coagulopathy, haemorrhagic disease of the newborn. Thrombotic disorders. Deep vein thrombosis, pulmonary embolism and anticoagulant therapy and monitoring.

MIC 401: Medical Bacteriology (1 Unit C: PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. identify basic safety procedures in the microbiology laboratory;
2. demonstrate staining techniques and use of light microscope;

3. discuss sterilisation and disinfection techniques;
4. explain cultivation of micro-organisms;
5. demonstrate biochemicals testing;
6. conduct slide agglutination tests; and
7. demonstrate sensitivity testing.

Course Contents
Practical bacteriology. Basic safety procedures in the microbiology laboratory. Staining techniques. Gram's reaction, Ziehl-Nielsen reaction and spore staining reaction. Use of light microscope. Sterilisation and disinfection techniques. Cultivation of micro-organisms. Biochemicals testing. Slide agglutination tests. Sensitivity testing.

MIC 403: Medical Mycology (1 Unit; C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define superficial infections;
2. describe subcutaneous infections;
3. define cutaneous infections;
4. explain systemic infections;
5. describe opportunistic infections;
6. demonstrate skin scrapings for the diagnosis of superficial dermatomycoses;
7. identify fungal morphology in microscopy and on Sabouraud's agar;
8. conduct rapid diagnostic tests; and
9. explain molecular diagnosis, PCR, ELISA.

Course Contents
Fungal infections, superficial, subcutaneous, cutaneous, systemic, opportunistic. Practical mycology, skin scrapings for the diagnosis of superficial dermatomycoses. Fungal morphology in microscopy and on Sabourauds agar. Rapid diagnostic tests. Molecular diagnosis, PCR, ELISA.

MIC 405: Medical Parasitology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe soil associated parasitic infections;
2. explain vector transmitted protozoan infections;
3. describe vector transmitted flavid nematode infections;
4. discuss animal associated parasitic infections, zoonoses;
5. enumerate environmental factors influencing transmission of parasitic infections;
6. explain nutrition and parasitic infections;
7. identify principles of control of parasitic infections;
8. demonstrate indirect diagnostic techniques for parasitic infections; and
9. explain molecular aspects of medical parasitology.

Course Contents
Soil associated parasitic infections. Vector transmitted protozoan infections. Vector transmitted flavid nematode infections. Animal associated parasitic infections (zoonoses). Environmental factors influencing transmission of parasitic infections. Nutrition and parasitic infections. Principles of control of parasitic infections. Indirect diagnostic techniques for parasitic infections. Introduction to molecular aspects of medical parasitology.

MIC 407: Applied Medical Microbiology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define encephalitis, meningitis, tetanus;
2. describe mumps, TB, pneumonia, pertussis;
3. differentiate gastroenteritis and food poisoning;
4. explain sexually transmitted disease and urinary tract infection, P. I. D;
5. describe infective endocarditis, rheumatic heart disease and pyoderma, cellulitis and myiasis, leprosy;
6. explain osteomyelitis, abscess, wound infections and pyomyositis, conjunctivitis;
7. enumerate principles of antibiotic and chemotherapy, modes of bacterial resistances to antibiotics, viral vaccines, prophylactic immunisation;
8. define pyrexia of unknown origin (PUO) and describe bacteria/septicaemia, sepsis;
9. explain Guillain-Barre Syndrome, Reye's Syndrome;
10. describe health care associated infections and define HIV/AIDS; and
11. explain progressive multifocal leukoencephalopathy and tropical spastic paraparesis.

Course Contents

Central nervous system, encephalitis, meningitis, tetanus. Respiratory tract, mumps, TB, pneumonia, pertussis. Gastrointestinal tract, gastroenteritis and food poisoning. Genitourinary system, sexually transmitted disease and urinary tract infection, P. I. D. Cardiovascular system, infective endocarditis, rheumatic heart disease. Skin, pyoderma, cellulitis and myiasis, leprosy. Musculoskeletal system, osteomyelitis, abscesses, wound infections and pyomyositis, conjunctivitis. General principles of antibiotic and chemotherapy, modes of bacterial resistances to antibiotics, viral vaccines, prophylactic immunization. Pyrexia of unknown origin (PUO). Bacteria/septicaemia (sepsis) Guillain – Barre Syndrome. Reye's Syndrome. Health care associated infections. HIV/AIDS. Progressive multifocal leukoencephalopathy. Tropical spastic paraparesis.

CPY 401: Clinical Chemistry of Disease II (3 Units C: LH 30; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe how to order clinically appropriate tests for disorders of the hypothalamo-pituitary axis;
2. illustrate how to conduct pregnancy test;
3. appreciate the ability to evaluate an infertile couple;
4. conduct hydrogen breath test; and
5. explain the role of tumour markers in screening, diagnosis.

Course Contents

Hypothalamo, Neuro and adreno hypophysis, functions, dysfunctions and investigations. Pituitary, thyroid functions, dysfunctions and investigations. Biochemical assessment of gonadal function in men and women. Investigations of fertility disorders. Biomarkers of cardiovascular disease. Adrenocortical function, dysfunction and disorders. Biochemical changes in pregnancy. Diagnosis of pregnancy. Assessment of foetal and placental integrity. Role of chemical pathology in the diagnosis and management of cancer. Gastrointestinal functions, dysfunction and investigations, xylose absorption, pancreolauryl test, PABA test, faecal elastase, disaccharidases test, Schilling's test, hydrogen breath test. The role of tumour markers in screening, diagnosis, treatment and monitoring of cancers.

CPY 403: Analytical Procedures and Practicals (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. demonstrate how to send suitable samples to the laboratory;
2. determine blood gases and blood PH;
3. estimate blood glucose by the glucose oxidase method (a specific method), and by the ferricyanide reduction method (a nonspecific method);
4. determine urine specific gravity osmolality and qualitative tests for protein, glucose and reducing substances, ketones, bilirubin, urobilinogen and blood;
5. demonstrate spectroscopy of haemoglobin and its derivatives in blood;
6. apply non-invasive modern methods of monitoring hyperbilirubinaemia such as cutaneous bilirubinometry;
7. determine occult blood in faeces.
8. estimate protein with different methods;
9. conduct electrophoresis of plasma proteins, haemoglobins and iso-enzymes;
10. demonstrate column chromatography;
11. conduct paper and thin layer chromatography of sugars and amino acids in urine;
12. demonstrate determination of serum enzymes;
13. conduct radioimmunoassay of hormones in blood; and
14. estimate 17-oxosteroid in urine, biochemical analysis of cerebrospinal fluid.

Course Contents

Specimen collection, different types of samples, tubes, sample identification, separation of plasma or serum, collection and preservation of urine specimens. Determination of blood gases and blood PH. Determination of glucose. Glucose estimation in blood by the glucose oxidase method (a specific method), Glucose estimation in the same blood by the ferricyanide reduction method (a nonspecific method) and strip test for glucose in blood (semiquantitative method). Plotting of oral glucose tolerance test curves for a normal patient and a diabetic patient. Urinalysis. Determination of urine specific gravity osmolality and qualitative tests for protein, glucose and reducing substances, ketones, bilirubin, urobilinogen and blood. Haemoglobin and haemoglobin derivatives in urine. Spectroscopy of haemoglobin and its derivatives in blood. Non-invasive modern methods of monitoring hyperbilirubinemianaemia such as cutaneous bilirubinometry. Estimation of blood gases, including use of pulse oximeter. Occult blood in faeces. Different methods of protein estimation. Electrophoresis of plasma proteins, haemoglobins and isoenzymes demonstration. Column chromatography, paper and thin layer chromatography of sugars and amino acids in urine. Determination of serum enzymes. Radioimmunoassay of hormones in blood. Estimation of 17-oxosteroid in urine, biochemical analysis of cerebrospinal fluid (CSF). Methods of vitamin analysis in blood. Estimation of immunoglobulins. Agglutination/Agglutination inhibition tests. Immunoelectrophoresis and gel Immunodiffusion technique.

COM 401: Introduction to Primary Health Care (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. explain origin and concepts of primary health care;
2. enumerate principles and components of primary health care, services;
3. describe concepts of community participation and community ownership;
4. illustrate management of PHC programmes steps in health planning (the planning cycle);
5. list management skills and techniques supervision, delegation (task shifting), motivation and leadership concept;

6. discuss health care financing, essential drug management (drug revolving fund);
7. describe health information management system;
8. explain public health laws; and
9. enumerate public health laboratories.

Course Contents
Origin and concepts of primary health care, definition of PHC. Principles and components of primary health care. PHC services. Community mobilisation for PHC, concepts of community participation and community ownership. Management of PHC programmes (organisation structure, planning, supervision and evaluation). The public health department. Steps in health planning (the planning cycle). Manpower development and training for PHC programmes (human resource management). Management skills and techniques, supervision, delegation (task shifting), motivation and leadership concept. Health care financing, essential drug management (drug revolving fund). Health information management system. Public health laws. Public health laboratories.

COM 403: Health Education and Health Advocacy (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define principles of health education;
2. enumerate roles, methods and media steps in planning a health education programme;
3. list health education strategies; and
4. appraise health education programme.

Course Contents
Definitions and principles of health education. Roles, methods and media, steps in planning a health education programme. Health education strategies (communication process, use of interpersonal communication skills). Evaluation of health education programme.

COM 405: Public Health Nutrition and Rehabilitation (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe relationship between diet and nutrition;
2. discuss nutritional values of common Nigeria foodstuff;
3. explain food supply and distribution, food chain and food security;
4. enumerate problems associated with unbalanced diet;
5. differentiate nutrition and health, infection and nutrition;
6. describe food policy, hygiene and toxicology;
7. explain assessment of nutritional status;
8. describe exclusive breastfeeding, complimentary feeding in children;
9. discuss rehabilitative medicine, underprivileged members of the society;
10. list classifications and causes of handicaps;
11. conduct critical appraisal for the case of the handicapped;
12. define disaster relief; and
13. compare social welfare services in Nigeria and other countries.

Course Contents
Public health nutrition definition. Relationship between diet and nutrition. Nutritional values of common Nigeria foodstuff. Food supply and distribution. Food chain and food security. Nutritional education. Problems associated with unbalanced diet. Nutrition and health. Infection and nutrition. Epidemiology and control of common nutritional disorders in Nigeria

(common eating habits, family feeding pattern and others). Food policy, hygiene and toxicology. Assessment of nutritional status (of a child and others). Exclusive breastfeeding, complimentary feeding in children. Rehabilitation, introduction to rehabilitative medicine. The underprivileged members of the society, classifications and causes of handicaps, critical appraisal for the case of the handicapped, provision of the underprivileged members of the community. Disaster relief. Comparison of social welfare services in Nigeria and other countries.

COM 407: Maternal and Child Health/Reproductive Health Education (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define concept of family health and describe family structures and patterns;
2. explain components and objectives of family health;
3. list factors influencing family health status;
4. list objectives and components of MCH services;
5. explain integration of MCH and family health services for rural and urban communities;
6. enumerate common causes of morbidity and mortality among women and children in different age groups in developing countries;
7. describe the role of traditional birth attendants (TBAS);
8. explain roles of international health agencies in MCH development;
9. discuss natural immunisation programme;
10. explain sexual and reproductive rights;
11. describe adolescent reproductive health;
12. explain critical appraisal of contraceptive methods; and
13. discuss epidemiology and prevention of STIs, HIV and reproductive tract cancers, HPV immunisation programme.

Course Contents

Maternal and child health (MCH). Concept of family health. Family structures and patterns. Components and objectives of family health. Factors influencing family health status, objectives and components of MCH services. Integration of MCH and family health services for rural and urban communities. Monitoring and evaluation of family health services, the common causes of morbidity and mortality among women and children in different age groups in developing countries (malaria in pregnancy, abortion harmful traditional practices). The role of traditional birth attendants (TBAS), roles of international health agencies in MCH development. School health programme, prenatal and safe motherhood, natural immunisation programme. Reproductive health education, sexual and reproductive rights, important conferences in reproductive health, adolescent reproductive health, critical appraisal of contraceptive methods, epidemiology and prevention of STIs, HIV and reproductive tract cancers, HPV immunisation programme.

COM 409: Immunity and Immunisation programme (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define immunity, immunisation, vaccination;
2. enumerate factors affecting immunity and describe national immunisation programme;
3. identify recent advances and development (GAVI);
4. explain role of family, community and NGOs in immunisation;
5. discuss vaccination advocacy and diplomacy for international travel during pandemic; and

6. identify travel medicine and medical tourism.

Course Contents
Definition of Terms. Immunity, immunisation, vaccination. Factors affecting immunity (age, nutrition, infection, cancers, radiation, drugs). National immunisation programme (NPI). Recent advances and development (GAVI). Role of family, community and NGOs in immunisation. Vaccination advocacy and diplomacy for international travel during pandemic. Travel medicine and medical tourism.

COM 411: Primary Health Care Posting (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe organisation of PHC services in a selected rural area;
2. identify PHC clinics, operations and facilities available;
3. visit LGA health department, vaccine stores, motherless and handicapped children, leprosarium, remand homes, school health services;
4. describe adequate supervision by the staff of the department; and
5. describe monitoring and evaluation of students activities.

Course Contents
Organisation of PHC services in a selected rural area. Primary health care clinics, operations and facilities available. Visits to LGA health department. Vaccine stores. Motherless and handicapped children. Leprosarium. Remand homes. School health services. Adequate supervision by the staff of the department. Monitoring and evaluation of students activities.

MED 401: Introduction to Clinical Medicine I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge and skills in the subject of the clinical interview;
2. demonstrate sound clinical skills in both general and systemic examinations;
3. investigate patients with utmost prioritisation;
4. demonstrate skills to manage and prevent diseases as may be applicable;
5. identify the key ethical issues;
6. recognise the elements of good clinical practice in contemporary medical practice;
7. define basic medical terms and specific terms in various branches/sub-specialties of internal medicine; and
8. identify components of the clinical interview.

Course Contents
Approach to the clinical interview. Basic clinical skills and approach to the clinical examination. Demonstration on how to elicit basic physical signs. Emphasis on technique and general approach to the patient. Immunological and genetic basis of diseases. Tutorials on elementary clinical medicine with emphasis on applied basic medical sciences (including basic principles of radiology).

MED 403: Introduction to Clinical Medicine II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the multidisciplinary nature of medical practice;
2. details of general medical terms and the scope of medical subspecialties

3. identify components of the clinical interview;
4. identify the key ethical issues and recognise the elements of good clinical practice in contemporary medical practice;
5. describe details of advances in ethical issues in medicine;
6. address hypothetical practical ethical issues and dilemmas; and
7. conduct basic therapeutic principles as applied to common disorders.

Course Contents
Introduction to various health workers and their various functions, with clear emphasis on where the health team/multidisciplinary approach to patient care intersects. Introduction to basic side-room tests on urine, stool, sputum and blood. Basic therapeutic principles as applied to common disorders.

MED 405: Cardiology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate knowledge and skills in cardiology;
2. recognise and manage common cardiac diseases especially in our environment;
3. respond to cardiovascular emergencies;
4. recognise cases that would need referral to specialised centres;
5. attain sound knowledge of the interaction between environment; and
6. identify risk factors, and genes in relation to cardiovascular diseases.

Course Contents
Approach to the evaluation of the cardiac patients and common symptomatology in cardiovascular diseases. Chest pain. Dyspnoea. Orthopnoea. Paroxysmal nocturnal dyspnoea and palpitations. Approach to cardiovascular system examination, the precordium, valvular areas, heart sounds and murmurs. Introduction to common cardiovascular diseases, hypertension, heart failure (epidemiology, clinical features, mechanisms/pathophysiology, investigation and diagnosis). Introduction to ECG.

MED 407: Nephrology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate knowledge and exhibit sound clinical skills in nephrology;
2. recognise and manage common renal diseases especially in our environment;
3. investigate patients with utmost prioritisation; and
4. manage and prevent the disease as may be applicable.

Course Contents
Electrolyte imbalance. Clinical features. Common causes. Investigations, and management. Valuation of glomerular diseases. Glomerulonephritis. Nephrotic syndrome. Urinary tract infection. Pyelonephritis. Immune-complex-mediated kidney disease (quartan malarial nephropathy).

MED 409: Clinics, Call Duty and Bed Side Teaching I (12 Units C: PH 540)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of MED 401 to 407;

2. demonstrate hands-on detailed clinical interview and physical examination skills;
3. illustrate doctor patient relationship and define patient education;
4. explain ethics of clinical practice; and
5. discuss professionalism.

Course Contents
Clinical evaluation according to the principles of MED 401 to 407. Hands-on demonstration of the clinical interview and examination skills, doctor patient relationship, patient education, ethics of clinical practice, and professionalism.

SUG 401: General Surgery I (5 Units C: LH 75)

Learning Outcomes
At the end of this course, students should be able to:
1. describe how to take detailed history;
2. perform physical examination;
3. investigate patients with surgical diseases;
4. demonstrate competence in typical clinical presentation of surgery patients;
5. explain diagnosis from symptoms and signs; and
6. discuss the multidisciplinary nature of surgical practice.

Course Contents
History and physical examination of the surgical patient. Physical signs in clinical surgery. Pre-operative preparation and post-operative care of patients. HIV-AIDS and the surgeon. COVID-19 and the surgeon. Universal precautions. Safe surgery. Multi-disciplinary health care team approach. Principles of surgery. Herniae. Lumps.

SUG 403: Paediatric Surgery (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify symptoms and signs of common paediatric surgical diseases;
2. describe diagnosis from symptoms and signs;
3. examine paediatric surgery patients; and
4. discuss complications that may arise from common paediatric surgical diseases.

Course Contents
Congenital anomalies, particularly the more manageable lesions of the gut, exomphalos, gastroschisis, intestinal atresia, malrotation and mid-gut volvulus. Hirschsprung's diseases and anorectal agenesis of the lower gastrointestinal tract. Groin and scrotal masses, hernias, hydroceles. Congenital infantile hypertrophic pyloric stenosis, causes of jaundice such as biliary atresia, choledochal cysts. Hypospadias and exstrophy-epispadias complex. Causes of intestinal obstruction, intussusception. Other congenital malformations and their management.

SUG 405: Clinics, Theatre and Call Duty Bed Side Teaching I (13 Units C: PH 585)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical teaching according to the principles of SUG 401 to 405.

Course Contents
Clinical teaching according to the principles of SUG 401 to 405.

PAT 402: Systemic Pathology II (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe congenital anomalies (epispadias, hypospadias, phimosis), cryptorchidism, orchitis, ambiguous genitalia, testicular torsion, tumours, BPH, and prostate cancer;
2. explain abnormalities of Mullerian duct fusion, PID, vulval dystrophy, vulva/vaginal cancer, chronic cervicitis, CIN and cervical cancer, DUB, endometritis, endometrial hyperplasia, endometriosis and adenomyosis, uterine tumours, ovarian cysts, ovarian tumours and Pre-eclampsia, ectopic pregnancy and gestational trophoblastic diseases;
3. enumerate inflammatory disorders of acute mastitis, mammary duct ectasia, fat necrosis, granulomatous mastitis, benign epithelial lesions- fibrocystic change, proliferative breast disease, breast carcinoma and male breast, gynaecomastia, carcinoma; and
4. discuss fractures, rickets/osteomalacia and osteoporosis, genetic bone disorders, osteomyelitis, bone tumours, paget's disease, arthritis and (osteoarthritis, rheumatoid arthritis, septic arthritis, seronegative arthritis), gout and other crystal arthropathies.

Course Contents
Male genitalia. Congenital anomalies (epispadias, phimosis, posterior urethral valve), cryptorchidism, orchitis, ambiguous genitalia, testicular tumours, BPH, prostate cancer. Female genitalia. Congenital anomalies (abnormalities of Mullerian duct fusion), PID, vulval dystrophy, vulva/vaginal cancer, CIN, cervical cancer, endometriosis, endometritis, endometrial hyperplasia, uterine tumours, ovarian cysts, ovarian tumours, pre-eclampsia, ectopic pregnancy, gestational trophoblastic diseases. Breast, inflammatory disorders (acute mastitis, mammary duct ectasia, fat necrosis, granulomatous mastitis), benign epithelial lesions (fibrocystic change, proliferative breast disease), gynaecomastia, breast tumours. Urinary system, renal cysts, glomerulonephritis, tubulo-interstitial nephritides, obstructive uropathy, nephropathy associated with malaria and other infections and infestations. thrombotic microangiopathies, congenital anomalies, renal tumours, cystitis, bladder cancer. Musculoskeletal system, fractures, rickets/osteomalacia, osteoporosis, genetic bone disorders, osteomyelitis, bone tumours, paget's disease, arthritis (osteoarthritis, rheumatoid arthritis, septic arthritis, seronegative arthritis, gout and other crystal arthropathies). Central nervous system, raised intracranial pressure, hydrocephalus, congenital anomalies, stroke, head injuries, intracranial haemorrhage, meningitis, encephalitis, brain abscess, demyelinating disorders, neurodegenerative disorders (Alzheimer's, Parkinson's, Huntington's chorea), spongiform encephalopathies, CNS tumours, skin, acute and chronic dermatoses, bullous diseases, verrucae, common skin infections, non-melanoma skin cancers (squamous cell carcinoma, basal cell carcinoma, and Kaposi sarcoma), melanoma.

PAT 404: Forensic Pathology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. identify types of wounds and injuries;
2. describe firearm and firearm injuries;
3. discuss sudden unexpected death;
4. define identification;
5. explain doctor at the scene of death and in court;
6. recognise signs of death;

7. conduct post-mortem examination;
8. discuss medical jurisprudence;
9. explain sexual offences;
10. describe asphyxia and drowning;
11. conduct medico-legal examination and report writing;
12. describe death certification; and
13. discuss confidentiality and medical ethics.

Course Contents
Types of wounds and injuries. Firearm & firearm injuries. Signs of death. Sudden unexpected death. Identification. Doctor at the scene of death. Doctor in court, post-mortem examination. Medical jurisprudence. Sexual offences. Criminal abortion. Hanging. Suffocation. Electrocution. Asphyxia. Drowning and investigation of poison death. Medico-legal examination and report writing. Death certification. Confidentiality and medical ethics.

PCL 402: Clinical Toxicology Pharmacology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the mechanisms of intoxication by heavy metals and the approaches to treatment;
2. describe mechanism, sources and treatments of cyanide poisoning;
3. discuss intoxication with insecticides;
4. enumerate types of insecticides, mechanisms of toxicity and treatments;
5. list classes of snakes and major toxic effects; and
6. describe pharmacology of snake venom.

Course Contents
Clinical Toxicology. Intoxication with heavy metals (mercury, arsenic, lead). Heavy metal antagonists (dimercaprol, EDTA, penicillamine). Cyanide poisoning and treatment. Intoxication with insecticides. Chlorinated hydrocarbons, organophosphates and cholinesterase reactivators. Pharmacology of snake venoms. Elapid venoms. Viperid venoms.

PCL 404: Central Nervous System Pharmacology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the role of COX and PGs in inflammation, pain and fever;
2. identify the role of PGs in homeostatic regulation of gastric function, kidney function, vasoconstriction and platelet activation;
3. describe basic pharmacology of the different classes of NSAIDs;
4. discuss the rationale behind use of low-dose aspirin as prophylactic in CV disease;
5. describe mechanism of salicylate toxicity caused by aspirin and its treatment;
6. explain mechanism of acetaminophen poisoning and its treatment;
7. illustrate the opioid system and its role in pain transduction;
8. describe pharmacology of narcotic analgesics and antagonists; and
9. discuss opioid-induced tolerance, physical dependence, addiction and pseudo-addiction.

Course Contents
Pain and Analgesics. Narcotic analgesics opioid system. Receptors, endogenous ligands, signal transduction pathways, role in pain. Concept of opioid-induced tolerance, physical dependence, addiction and pseudo-addiction. Basic pharmacology of narcotic analgesics (morphine, pethidine, methadone and congeners), narcotic antagonists, full and partial antagonists

(nalorphine, levallorphan, naloxone). Non-Steroidal Anti-Inflammatory drugs (NSAIDs). Role of cyclo-oxygenase and prostaglandins in aetiology of inflammation, pain and fever, role of prostaglandins in homeostatic regulation of gastric function, kidney function, vasoconstriction and platelet activation. Basic pharmacology of NSAIDs (aspirin and salicylates, traditional NSAIDs, COX-2 inhibitors, acetaminophen). Rationale behind unique indication for low-dose aspirin as prophylactic treatment in development of CV disease. Pharmacokinetics of aspirin and the mechanism that lead to the development of salicylate toxicity. Mechanism underlying acetaminophen poisoning and its treatment. Epilepsy and Antiepileptic Drugs. Different types of seizures. Seizure types as determinants of specific antiepileptic drugs used in management. Spectrum of action of most commonly used drugs. Selection process of an epileptic drug for a given seizure type, based on its mechanism of action efficacy, clinical pharmacokinetics (ease of use), drug-drug interaction potential, tolerability (common side effects), serious toxicity (idiosyncratic reactions). Role of co-morbidities in the selection of an epileptic drug. Antidepressants Primary sites of action of the different classes of antidepressants, Tricyclic antidepressants, TCAs, (imipramine, amitriptyline, clomipramine, desipramine, doxepin). Selective-serotonin reuptake inhibitors, SSRIs, (citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline), Noradrenaline/serotonin reuptake inhibitors, SNRIs, (Venlafaxine, desvenlafaxine, nefazodone), monoamine oxidase inhibitors, MAOIs, (Irreversible, phenelzine, tranylcypromine and selegiline and reversible such as moclobemide). Adverse side effects of the different classes with respect to use in certain population (elderly, pregnancy), Pharmacological sites of actions that contribute to the acute or chronic side effects of these drugs. Proposed mechanism underlying the delayed therapeutic effects. Considerations in using irreversible MAOIs, their potential adverse effects and the important considerations in switching between MAOIs and SSRIs or other antidepressants. Antipsychotic drugs, the four well-defined dopamine systems in the brain as they relate to antipsychotic drug action and side effects. Distinction between the typical (chlorpromazine, haloperidol) and atypical antipsychotics (risperidone, olanzapine, quetiapine, ziprasidone, aripiprazole, paliperidone), difference in mechanism of action between the typical antipsychotics, atypical antipsychotics and the partial agonist, aripiprazole, common and rare side effects associated with use of both low potency and high potency antipsychotics as well as the second-generation antipsychotics. Sedative-Hypnotic Drugs used in treating anxiety and sleep disorders. Sleep and wakefulness. Structural aspects of GABAA receptor and the receptor. Components (binding sites) mediating the effects of drugs that modulate GABAA receptor activity. Differences between benzodiazepines with respect to time of onset, potency, metabolism and elimination half-lives. Similarities and differences between the benzodiazepines and the barbiturates in producing sedative-hypnotic effects. Factors to consider in choosing the most appropriate drug for specific clinical situations and/or individuals. Characteristics of benzodiazepines and other sedative-hypnotics that contribute to different degrees of abuse liability and withdrawal symptoms. Target sites or putative mechanisms of non-benzodiazepine drugs that can be used to treat sleep disorders, Barbiturates, bromides, cyclic ethers, paraldehyde, carbamic acid esters (meprobamate), chloral derivatives (chloral hydrate) piperazine dienes (glutethimide, methyprylon) alcohols. Target sites of action for SSRIs and strategy for using SSRIs in combination with benzodiazepines in the treatment of anxiety. Bipolar affective disorder and drugs used in management. Target sites of action for lithium, its pharmacokinetics, adverse effects and considerations in its use. Sites of action, adverse effects and considerations in using anticonvulsants (carbamazepine, lamotrigine, valproate) and the atypical antipsychotics (aripiprazole, olanzapine, quetiapine, risperidone, ziprasidone) to treat bipolar disorder. Potential risks of birth defects with use of lithium, valproate, carbamazepine and lamotrigine in pregnant women. Parkinson's disease and drugs used in management. Pathophysiology of Parkinson's disease and its presentation; functional circuitry of the nigrostriatal system. Major classes of drugs used in management and the timeline for their use, indications, mechanism of action, adverse effects and contraindications. Types and

mechanisms of alternative treatments. Local Anaesthetics. Mechanism by which local anaesthetics block nerve conduction, how their physiochemical properties (esters and amides) influence their pharmacodynamics and pharmacokinetics. The side effects that may occur with their use and why they occur. Unique characteristics and the common clinical use for each prototypical local anaesthetic. Common uses with emphasis on spinal and epidural anaesthesia, commonly caused severe complications of their use. General anaesthetics. Definition of general anaesthesia and how it is achieved, stages of anaesthesia. Pharmacokinetics of inhalational anaesthetics. Blood, gas coefficient, ventilation rate and pulmonary blood flow influence on the onset (and termination) of action of inhalational anaesthetics, influence of tissue blood flow on the tension of anaesthetic gas in that tissue, definition of minimum alveolar concentration (MAC) and what information it provides on a volatile anaesthetic. Pharmacokinetic properties of the ultra-short-acting hypnotics and how they make this class of drugs popular general anaesthetic drugs. Advantages and disadvantages of clinically used inhaled and intravenously administered general anaesthetics, when they should be used, their contraindications. Concept that inhalational and intravenous anaesthetics cause varying degrees of respiratory depression with exception of ketamine. Use of anaesthetics in persons already taking drugs such as neuromuscular blocking drugs and CNS stimulants.

PCL 406: Endocrine Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the role of thyroid hormone in regulating development, metabolism and calorigenesis;
2. identify the steps in synthesis of T4 and T3 and discuss the endocrine regulation of T3 and T4 production and feedback loops, physiological role of T3 and T4 and changes associated with hypo- and hyperthyroidism;
3. enumerate the various thyroid hormone preparations and thyroid hormone antagonists (classes and examples) and describe the pharmacology of thyroid hormone preparations and thyroid hormone antagonists;
4. explain the use of adjunct drugs in treatment of hyperthyroidism;
5. describe the role of ACTH and HPA axis in regulation of corticosteroid synthesis and the principal physiological responses to both glucocorticoids and mineralocorticoids;
6. explain the use of synthetic glucocorticoid and mineralocorticoid drugs in management of the specified endocrine disorders; and
7. describe the pharmacology of adrenocorticosteroids synthetic analogues and inhibitors.

Course Contents

Drugs used in endocrine disorders. Physiology of neuroendocrine hormonal regulation, specifically the regulation and function of the hypothalamus pituitary growth hormone axis. Hypothalamus pituitary reproductive axis. Hypothalamus pituitary prolactin axis. Adenohypophysis hormones and related substances, anterior and posterior pituitary hormones, ACTH, growth hormone, prolactin, thyrotropin, gonadotropic hormones. Use of specific neuroendocrine drugs in the treatment of growth hormone deficiency (recombinant HGH, somatropin, synthetic GHRH, sermorelin, recombinant IGF-1). Growth hormone excess (octreotide, Pegvisomant). Infertility (HCG, menotropins, urofollitropin, follitropin, synthetic GHRH and analogues, Gosselin, GnRH antagonists, ganirelix) and Hyperprolactinaemia (dopamine receptor antagonists, bromocriptine). Indications, mechanism of action, adverse effects, contraindications and therapeutic considerations for the major neuroendocrine hormones and pharmacological drugs. Adrenocortical steroids. Role of ACTH and HPA axis in regulation of corticosteroid synthesis. Principal physiological responses to both glucocorticoids and mineralocorticoids, especially role of cortisol and exogenous glucocorticoids in negative

feedback suppression of the HPA axis. Use of synthetic glucocorticoid and mineralocorticoid drugs in treatment of adrenal insufficiency and congenital adrenal hyperplasia; therapeutic uses of adrenocorticosteroid in non-endocrine disease, asthma, rheumatoid arthritis, inflammation and cancer. Pharmacology of adrenocorticosteroids synthetic analogues (hydrocortisone, cortisone, prednisone, prednisolone, dexamethasone) and inhibitors (metyrapone, aminoglutethimide). Diabetes mellitus pathophysiology, type I and II, fundamental differences in types, diagnostic criteria and therapeutic goals. Pharmacological differences between the various insulin formulations, especially in their duration of action (rapid-regular- intermediate- and long-acting insulins), specifically which insulin types are used to control post-prandial glucose levels versus fasting glucose levels. Use and clinical benefits of an intensive insulin therapy regimen in type I diabetes. Indications, mechanism of action, clinical effects, adverse effects and contraindications of drugs used in management of type II diabetes. Sulphonylureas, biguanides, meglitinides, thiazolidinediones, alpha-glucosidase inhibitors, modulators of incretin pathway, pramlintide, glucagon, insulin, understanding which drugs used for treatment of type II primarily affect either post-prandial or fasting glucose levels. Concept of combination therapy with oral drugs, as well as potential use of insulin therapy in type II. Current treatment algorithm approved by the American Diabetes Association for type II diabetes. Effectiveness of tight glycaemic control in prevention of macro- and microvascular complications; treatment of diabetic ketoacidosis. Thyroid and Anti-thyroid Drugs. Role of thyroid hormone in regulating development, metabolism and calorigenesis. Steps in synthesis of tetraiodothyronine (T4) and triiodothyronine (T3), endocrine regulation of T3 and T4 production and feedback loops, physiological role of T3 and T4 and changes associated with hypo- and hyperthyroidism. Thyroid hormone preparations. Thyroid hormone antagonists, thioamides, propylthiouracil, methimazole, carbimazole, thiocyanate, ionic inhibitors, perchlorate, Iodine, other drugs, propranolol and hydrocortisone. Gonadal hormones, oestrogens and progestins, physiological actions, pharmacological effects, clinical uses (contraception and hormonal replacement therapy in menopause), adverse effects and contraindications, pharmacological actions and clinical uses of selective oestrogen receptor modulators (SERMs). Androgens, physiological actions, pharmacological effects, clinical uses, adverse effects and contraindications of androgens (testosterone, dihydrotestosterone, methyltestosterone) and their antagonists (finasteride, flutamide, spironolactone).

PCL 408: Chemotherapy (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe host-drug-pathogen relationship in chemotherapy;
2. list the various ways of classification of antimicrobials based on type of organism against which primarily active, chemical structure, spectrum of activity;
3. define the common terminologies used in antimicrobial chemotherapy and enumerate the properties of an ideal antimicrobial agent;
4. describe the concept of combination therapy and identify the choices of antibacterial drugs used to treat common infections and enumerate the classes of antibacterial agents;
5. explain pharmacology of β-lactam antibiotics including their potential for cross-allergenicity, distribution characteristics, and contraindications of each group;
6. discuss the differences in spectrum of activity between the natural penicillins, the penicillinase-resistant penicillins, the aminopenicillins, the carboxypenicillins, the ureidopenicillins and the β-lactamase inhibitor combinations with attention to the specific drugs that have activity against Staph. aureus, Pseud. aeruginosa and Bact. fragilis;
7. list the differences in spectrum of activity between the four generations of cephalosporins, as well as the carbapenems and aztreonam, pharmacology of the cephalosporins, the

carbapenems and aztreonam, including risk of cross-reactivity between these classes and the penicillins;
8. explain the pharmacology of the various generations of quinolones, particularly those with activity against Staph. aureus, Strep. pneumonia, Pseud. aeruginosa, atypical bacteria and anaerobes;
9. describe pharmacology of aminoglycosides, with attention to drugs that display activity against Staph. aureus, Pseud. aeruginosa and tuberculosis;
10. enumerate factors that may alter pharmacokinetics of aminoglycosides and their dosage;
11. explain pharmacology of vancomycin and other drugs with activity against gram-positive aerobes;
12. describe pharmacology of tetracyclines and sulphonamides and the potential therapeutic advantages of the glycylcycline antibiotics and discuss pharmacology of clindamycin and metronidazole;
13. explain the necessity of dosage adjustment of antibacterial therapy in renal insufficiency and removal by haemodialysis;
14. describe the mechanisms by which bacteria develop resistance to the different classes of antibacterial agents;
15. enumerate treatment principles in tuberculosis, including major determinant outcome of treatment and ways to improve this;
16. explain the mechanisms of resistance in TB infection and reasons for resurgence and ways to stop epidemic;
17. describe the therapeutic indications of rifampicin and explain the pharmacology of antituberculosis drugs;
18. discuss pharmacology of drugs used in the treatment of leprosy;
19. enumerate distinctions between protozoal and helminth infections;
20. discuss the general approaches to anti-parasitic and anti-helminthic therapy;
21. list the drugs used in treatment of the specified parasitic and helminthic infections;
22. explain the pharmacology of the major drugs used in treatment of protozoal and helminth infections; and
23. list factors that lead to antimicrobial treatment failure.

Course Contents

Definition of common pharmacodynamics terminology used to describe the effects of antimicrobial therapy. Bacteriostatic. Bactericidal. Concentration-dependent and time-dependent bactericidal activity. Antimicrobials that display each of these properties. Combinations of antibiotics. Choice of antibacterial drugs in common infections. Penicillin, differences in chemical structure between the penicillins. Cephalosporins. Carbapenems and monobactams. General characteristics of β-lactam antibiotics including their mechanism of action. Elimination half-life, route of elimination and potential for cross-allergenicity. Differences in spectrum of activity between the natural penicillins. The penicillinase-resistant penicillins. The aminopenicillins. The carboxypenicillins. The ureidopenicillins and the β-lactamase inhibitor combinations with attention to the specific drugs that have activity against Staph. aureus, Pseud. aeruginosa and Bact. fragilis, distribution characteristics into the cerebrospinal fluid, urinary tract, lungs, skin/soft tissue and bone. Indications. Mechanism of action. Adverse effects and contraindications of each group. Mechanism by which bacteria develop resistance to penicillins. Cephalosporins, carbapenems and monobactams. Differences in spectrum of activity between the four generations of cephalosporins, as well as the carbapenems and aztreonam, indications, mechanism of action, adverse effects and contraindications, mechanism by which bacteria develop resistance, pharmacokinetics particularly those drugs that penetrate the CNS and those that require dosage adjustment, risk of cross-reactivity between these classes and the penicillins, major clinical uses of representative drugs within each generation of cephalosporin, carbapenems and aztreonam.

Quinolones. The various generations, spectrum of activity of the older and respiratory fluoroquinolones, particularly those with activity against Staph. aureus, Strep. Pneumonia, Pseud. aeruginosa, atypical bacteria and anaerobes, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs. Major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in renal insufficiency and removal by haemodialysis. Aminoglycosides. Spectrum of activity with attention to drugs that display activity against Staph. aureus, Pseud. aeruginosa and tuberculosis, indications, mechanism of action, adverse effects, contraindications and major drug interactions; mechanism of resistance to the drugs, major pharmacokinetic characteristics including understanding of patient characteristics that may alter the pharmacokinetic parameters of volume of distribution and clearance, as well as how these alterations may influence dosing. Vancomycin and other drugs with activity against Gram-positive aerobes. General spectrum of activity of vancomycin, quinupristin-dalfopristin, linezolid and daptomycin, indications, mechanism of action, adverse effects and contraindications, mechanism of resistance to the drugs, major pharmacokinetic characteristics including bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in renal insufficiency and removal by haemodialysis. Tetracyclines and sulphonamides. Spectrum of activity, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs, major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in end-organ dysfunction and removal by haemodialysis, potential therapeutic advantages of the glycylcycline antibiotics. Clindamycin and metronidazole. Spectrum of activity with emphasis on activity against anaerobes and Clostridium difficile, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs, major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in end-organ dysfunction and removal by haemodialysis.
Antimycobacterial drugs. Indications, mechanism of action, adverse effects and contraindications of the first line antituberculosis drugs, treatment principles in treating M. tuberculosis infection, therapeutic indications of rifampicin, mechanisms of primary and secondary resistance in M. tuberculosis infection, reasons for resurgence of tuberculosis and ways to stop epidemic, major determinant outcome of treatment and ways to improve this basic pharmacology of drugs used in the treatment of leprosy (sulphones). Anti-parasitic drugs, distinction between protozoal and helminth infections, general approaches to therapy, general strategies and relevant drugs used to treat the following infections, malaria Amoebiasis, African Trypanosomiasis, American trypanosomiasis, Cryptosporidiosis and Toxoplasmosis. General strategies and relevant drugs used to treat major helminth infections. Principal indications, mechanism of action, adverse effects and contraindications of the major drugs used in treatment of protozoal and helminth infections. Malaria. Chloroquine, diamino pyrimidines, proguanil, primaquine, quinine and quinidine, artemisinins, antibiotics. Amoebiasis, metronidazole, emetine, dihydroemetine, iodoquinol, paromycin, amoebic liver abscess. Trypanosomiasis. Suramin, melarsoprol, melarsonyl, nifurtimox, benznidazole. Cryptosporidiosis, nitazoxanide. Toxoplasmosis, pyrimethamine, folinic acid, sulfadiazine, clindamycin. Schistosomiasis and paragonimiasis. Niridazole, antimony compounds, bithionol. Leishmaniasis, Sodium stibogluconate, pentamidine. Filariasis, diethylcarbamazine. Tapeworms, niclosamide. Roundworms, piperazine, thiabendazole, tetrachlorethylene, mebendazole. Antimycotic drugs Indications, mechanism of actions, adverse effects and contraindications of the most commonly used drugs; polyene antifungals (amphotericin B, nystatin), azole antifungals (imidazoles such as miconazole, clotrimazole and ketoconazole, triazoles such as fluconazole and itraconazole), echinocandins (caspofungin, micafungin and anidofungin) and others such as 5-flucytosine, griseofulvin and terbinafine. Antiviral Drugs.

Mechanism of action of major nucleoside and non-nucleoside analogues. Viruses targeted by the major nucleoside and non-nucleoside analogues and the relative benefits of each drug. Indications, mechanism of action and clinical efficacy of inhibitors of viral entry or dissemination. Mechanism of action leading to antiviral resistance. How drugs targeting different stages of viral infection can be synergistic when administered simultaneously. Nucleoside analogues (acyclovir, ganciclovir, idoxuridine, vidarabine, azidothymidine, dideoxy inosine, dideoxy cytosine). Non-nucleoside analogues (ribavirin, foscarnet), inhibitors of viral entry and dissemination (amantadine, neuraminidase inhibitors, pieconoril, interferons, passive antibody transfer). Antiretroviral drugs. How distinct antiretroviral drug classes target the different phases of HIV replication cycle, diagnostic criteria and therapeutic goals, indications, clinical uses, major adverse effects, contraindications and significant drug interactions for each class, utility and effectiveness of combination therapy, influence of presence of co-morbid conditions on antiviral regimen; nucleoside/nucleotide reverse transcriptase inhibitors, non-nucleotide reverse transcriptase inhibitors, protease inhibitors, viral integrase inhibitors, fusion inhibitors and chemokine receptor antagonists. Drugs used in treatment of malignant diseases. Major features of malignant disease. Review of cell kinetics, cell cycle specificity, cell cycle non- specificity. Cancer cell vs. bacterial infections. Importance of tumour cell heterogeneity and the development of resistance to chemotherapy as critical factors in determining treatment outcome. Process of antineoplastic drug development. Criteria for determining response to antineoplastic drugs. Importance of tumour staging in patient management. General principles of antineoplastic drug treatment. Rationale for administration of adjuvant chemotherapy. Concept of multiple drug-resistance, cumulative toxicity, schedule independent toxicity, concept of hormonally sensitive neoplasms and their treatments. Pharmacology of cytotoxic drugs. Characteristic indications, adverse effects, mechanism of resistance. Alkylating drugs (mechlorethamine, cyclophosphamide, chlorambucil, melphalan, busulfan). Antibiotics (Actinomycin D, Daunorubicin, Anthracycline mithramycin, Adriamycin), Antimetabolites (methotrexate, cytarabine, 5-flurouracil), Miscellaneous (procarbazine, nitroureas, hydroxyureas). Radioactive isotopes. Adrenal corticosteroids. Steroid hormones and antagonists. Drugs for immunotherapy.

MIC 402: Medical Virology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe viral families of medical importance and diseases caused by each member;
2. identify methods of diagnosis of viral diseases; and
3. describe ways by which viral diseases are treated and prevented.

Course Contents

DNA/RNA viral families, members and diseases caused. Influenza, poliomyelitis, smallpox, measles, yellow fever, Lassa fever, mumps, rubella, dengue, Herpes I and II, Hepatitis B and C, Ebola. HIV and SARS-COV-2/CORONA Viruses and other viruses of public health interest. Diagnostic tests such as serological and molecular techniques, ELISA and PCR. Complement fixation test (CFT), neutralisation test (NT), haemagglutination test (HAT). Cytopathic effect (CPE) in tissue cultures. Chemotherapeutic agents, vaccines available for the treatment and prevention of viral diseases as well as other preventive procedures available.

MIC 404: Medical Entomology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define medical entomology;

2. list common arthropod vectors of infective agents of medical importance; and
3. apply knowledge of medical entomology in clinics.

Course Contents
Introduction to Medical entomology. Common arthropod vectors of infective agents of medical importance. Practical entomology.

MIC 406: Medical Protozoology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe structure, life cycle and identification of listed and provided protozoa;
2. demonstrate thin and thick films;
3. illustrate staining techniques, Giemsa, Wrights, Field's and Leishman's Stains; and
4. conduct wet 'mounts and identification of trophozoites, Cysts of E. histolytica, Giardia, Trichomonas, B. coli.

Course Contents
Structure, life cycle and identification of the following protozoa, Plasmodium spp. Toxoplasma gondii, Asospora horninis and belli Entaemoeba histolytica and gingivitis, Opportunistic pathogenic Amoeba, Non-pathogenic Amoeba, Giardia intestinalis, Trichomonas spp. Chilomatix mesnilli, Balantidium coli, Trypanasoma spp. Leishmania spp. Practical Protozoology. Thin and thick films. Staining techniques, Giemsa, Wrights, Field's and Leishman's Stains. Wet 'mounts and identification of trophozoites, Cysts of E. histolytica, Giardia, Trichomonas, B. coli.

MIC 408: Medical Helminthology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe some listed and provided helminthes;
2. discuss wet mounts from stool/urine/sputum;
3. demonstrate thin and thick films for identification of microfilaria;
4. demonstrate skin snips; and
5. identify helminthes from tissue biopsy.

Course Contents
Description and identification of the following Helminthes, Schistosoma spp. Paragonimus westermanii, Fasciolopsis buski, Metagoninus yokogawai, Heterophyes heterophytes, Dicrocoelium hospes, Taenia spp. Echinococcus granulosus, Hymenolepsis nana, Diphylobothrium latun, Ascaris lumricoides, Strongyloides stercoralis, Ancylostoma duodenanale, Necator americanus, Enterobius vermicularis, Trichuris trichiura, Wuchereria bancrofti, Loa, loa, Brugia malayi, Dracunculus medinensis, Onchocerca volvulus, Trichinella spiralis. Practical Helminthology. Wet mounts from stool/urine/sputum. Thin and thick films for identification of microfilaria. Skin snips. Identification of Helminthes from tissue biopsy.

MIC 410: Microbial Genetics (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. identify bacterial genetic materials;
2. define genetic code;

3. explain transcription and translation;
4. discuss mechanism of gene transfer via transformation, transduction and conjugation;
5. describe genetic basis of variation and define bacteriophages; and
6. explain genetic basis of drug resistance.

Course Contents
Definition of terms, bacterial genetic materials. Genetic Code. Transcription and translation. Mechanism of gene transfer. Transformation. Transduction. Conjugation. Genetic basis of variation. Bacteriophages. Genetic basis of drug resistance.

CPY 402: Clinical Nutrition and Nutritional Support (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate the physiologic function and consequences of deficiencies or excesses of various macro, and micronutrients and trace elements;
2. explain biochemical functions of lipid and water-soluble vitamins and describe coenzyme structure and function;
3. enumerate indications of enteral and parenteral nutritional support and discuss complications of various forms of nutritional support; and
4. describe role of chemical pathology laboratory in the diagnosis, monitoring of nutritional disorders and nutritional support.

Course Contents
Nutritional requirements and nutritional disorders. Biochemical functions of micronutrients and trace elements. Lipid soluble vitamins. Water soluble vitamins. Coenzyme structure and functions, biochemical investigations of various micronutrients associated disorders. Nutritional support in clinical medicine, indications of enteral and parenteral nutritional support, complications of various forms of nutritional support. Role of chemical pathology laboratory in the diagnosis and monitoring of nutritional disorders and nutritional support.

CPY 404: Clinical Enzymology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate types of plasma enzymes;
2. define inborn errors of metabolism and discuss the various inborn errors of metabolism;
3. explain the sources and uses in interpretation of results obtained by analysis of plasma enzymes;
4. list non-pathologic causes of elevation of selected plasma enzymes; and
5. describe overview and consequences of the management of common inborn errors of metabolism.

Course Contents
Plasma enzymes, transaminases, alkaline and acid phosphatases, creatine kinase, lactic dehydrogenases and their uses in diagnosis and management of various diseases. Interpretation of enzyme levels in various diseases. Non-pathologic causes of elevation of selected plasma enzymes. Inborn errors of metabolism, definition, causes, consequences, and an overview of the management of common inborn errors of metabolism. Galactosaemia, lactose intolerance, albinism, aminoaciduria, phenylketonuria.

HAE 402: Blood Transfusion and Transplantation (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. list indications for blood transfusion and explain methods of blood storage, anticoagulants and shelf-lives;
2. describe blood component preparation, indications, and rational use of blood;
3. list steps of compatibility testing, bedside transfusion checks, and complications of blood transfusion;
4. enumerate the various types of blood donors with their merits and demerits and explain the donor selection criteria; and
5. describe the process of blood collection and screening and enumerate the recommended mandatory TTIs screened for in Nigeria.

Course Contents

Introduction to red blood cell serology. Antigens and antibodies of ABO and Rh blood group systems, haemolytic diseases of foetus and newborn. Blood donation. Donor recruitment including criteria for acceptance and deferrals for allogenic blood donors. Blood collection and screening for TTIs including HIV–screening and window period. Clinical blood transfusion. Indications for blood transfusionn, blood storage, blood fractionation and component therapy, rational use of blood, blood compatibility testing, bedside pre-transfusion check. Complications of blood transfusion and management. Immediate, delayed, immunological and non-immunological.

HAE 404: Practical and Interpretative Haematology (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. describe how to correctly fill the relevant request forms in haematology and blood transfusion;
2. explain specimen collection, types of specimen bottles and anticoagulants used in haematology and blood transfusion;
3. explain interpretation of common haematological tests, technique, indications, complications of bone marrow examination;
4. describe competence and skills in performing common haematological tests, identification of common haematology laboratory equipment including their uses;
5. explain principles and interpretation of haemoglobin electrophoresis, sickling;
6. describe solubility tests and HPLC for Hb genotyping;
7. list indications, technique and complications of bone marrow aspiration cytology and trephine biopsy; and
8. demonstrate equipment used in haematology diagnostic laboratory.

Course Contents

Filling haematology and blood transfusion request forms. Specimen handling, transportation and processing. Types of specimen bottles and anticoagulants used in haematology and blood transfusion. Interpretation of common haematological tests. Full blood count, clotting profile including INR, ABO and Rh blood grouping. Direct and indirect Coomb's test. Analytical procedures. Principles of haemoglobin and haematocrit estimation, blood films and staining WBC and platelet counts. Film of SS and SC patients, film of iron-deficiency and megaloblastic anaemia. E.S.R. estimation. Tests for thrombin time, PT/INR/PTTK estimation of fibrin degradation products. Principles and interpretation of haemoglobin electrophoresis, sickling and solubility tests and HPLC for Hb genotyping. Indications, technique and complications of

bone marrow aspiration cytology and trephine biopsy. Demonstration of equipment used in haematology diagnostic laboratory.

MED 402: Respiratory (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. exhibit sound clinical skills in the evaluation of the respiratory patient;
3. investigate patients with utmost prioritisation;
4. demonstrate the knowledge and skills to manage and prevent the disease; and
5. identify risk factors, individual and community level for respiratory system.

Course Contents
Approach to evaluation of respiratory symptoms. Pneumonias (Pneumococcal, Staphylococcal, H. influenzea), tuberculosis. Airway disease (asthma, alveolitis). Some common complications of chest diseases such as pleural effusion emphysema, pulmonary fibrosis, pleurisy.

MED 404: Gastroenterology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge and skills in gastroenterology and hepatology;
2. recognise and manage common gastroenterology/hepatology diseases especially in our environment.
3. exhibit sound clinical skills in the evaluation of the gastroenterology patient;
4. investigate patients with utmost prioritisation;
5. manage and prevent the disease as may be applicable; and
6. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Approach to evaluation of gastrointestinal symptoms. Jaundice, differential diagnosis and investigations. Evaluation of weight loss, differential diagnosis and investigations. Evaluation of patients with abdominal pain, abdominal swelling upper GI haemorrhage. Nutritional disorders, clinical presentation, causes and investigations. Oesophagitis, gastro-enteritis (acute, chronic), peptic ulcer disease (with complications), cholecystitis, pancreatitis (acute and chronic), hepatitis. Acute infective (type A), chronic (type B), non A, non B. Hepatoma (prevalence, causes), ascites (causes, management), abdominal masses, gastrointestinal haemorrhage, malabsorption syndromes and GIT infections, dysentery.

MED 406: Infectious and Tropical Diseases (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of and skills in infectious and tropical diseases;
2. recognise and manage common infectious and immunological diseases especially in our environment;
3. exhibit sound clinical skills and investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. offer appropriate health education.

Course Contents
Evaluation of the febrile patient. Epidemiology, prevention and control, aetiological agents in infectious diseases (incubation period, morphology), pathogenesis (acquisition and transmission), laboratory diagnosis, clinical presentation and management and socioeconomic relevance of infectious diseases. Systemic inflammatory response syndrome/sepsis, typhoid fever. HIV/AIDS including epidemiology, pathogenesis, features, asymptomatic or symptomatic infections. diagnosis, opportunistic infections such as tuberculosis and candidiasis, prevention, management and control. Emerging and remerging viral infections, Sars-Cov-2, viral haemorrhagic fevers, malaria, envenomation, snake and scorpion bites, bee stings.

MED 408: Neurology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge and skills in neurology;
2. recognise and manage common neurological diseases especially in our environment;
3. exhibit sound clinical skills and investigate patients with utmost prioritisation; and
4. manage and prevent the disease as may be applicable and offer appropriate health education.

Course Contents
Approach to evaluation of the neurology patient, mini mental state, cranial nerves, motor and sensory and autonomic system. Evaluation of common neurological symptoms and diseases headache, pain, muscle weakness. Tetanus.

MED 410: Clinics, Call Duty and Bed Side Teaching II (12 Units C: PH 540)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of MED 402 to 406;
2. demonstrate detailed clinical interview and physical examination skills;
3. illustrate doctor patient relationship;
4. define patient education;
5. enumerate ethics of clinical practice; and
6. discuss professionalism.

Course Contents
Clinical evaluation according to the principles of MED 402 to 406. Hands-on demonstration of the clinical interview and examination skills, doctor patient relationship, patient education, ethics of clinical practice, and professionalism.

SUG 402: General Surgery II (5 Units C: LH 75)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss how to take history for specific surgical cases and describe how to take detailed history for specific surgical cases;
2. investigate patients with surgical diseases;
3. demonstrate competence in typical clinical presentation of surgery patients; and
4. explain diagnosis from symptoms and signs.

Course Contents
Solid tumours, benign and malignant. Ulcers. Thyroid diseases, goitre, and other endocrine abnormalities. Gastrointestinal pathology. Conditions associated with herniae, gangrenous bowel, peritonitis, intra-abdominal abscess and fistula. Hepato-biliary disease. Breast diseases.

SUG 404: Urology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate clinical skills sufficient for the formulation of diagnoses and management of the patient with surgical diseases;
2. interpret the features into clinical diagnosis;
3. investigate surgical patient; and
4. refine the differential diagnoses to a definitive diagnosis.

Course Contents
Diseases that cause obstructive uropathy (urethral stricture, benign prostatic enlargement and prostate cancer) and its complications (upper tract obstruction, hydronephrosis, renal failure and fistulae). Urolithiasis and urological trauma. Haematuria and its causes. Non-prostatic benign and malignant urological tumours. Acute and chronic urological infections. Hydrocoele. Neuro-urology and urological complications of systemic diseases. Introduction to renal transplantation. Paediatric urology, congenital malformations (hypospadias, epispadias, bladder exstrophy, posterior urethral valves). Wilm's tumours. Urinary tract infections. Reflux disease.

SUG 406: Clinics, Theatre and Call Duty Bed Side Teaching II (13 Units C: PH 585)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of SUG 401 to 405.

Course Contents
Clinical evaluation according to the principles of SUG 401 to 405.

500 Level

OBG 501: General Gynaecology (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the gross anatomy of the pelvis and specifically the female genital tract, their innervations and blood supply;
2. explain the chronological order of history taking;
3. demonstrate how to take history and carry out obstetrics and gynaecological examination;
4. describe how to use information from history to arrive at differential diagnosis;
5. enumerate the various physiological changes in all organs and systems in pregnancy;
6. discuss how the physiological changes affect pregnancy;
7. explain the concept of antenatal care;
8. enumerate the components of antenatal care;
9. discuss why various investigations are carried out on pregnant women during antenatal care;

10. elucidate how quality antenatal care leads to good pregnancy outcomes;
11. discuss the maternal mortality rate/ratio in different parts of the country;
12. enumerate the causes of maternal mortality;
13. explain the prevention of maternal mortality in Nigeria;
14. describe history taken from victims of sexual assault;
15. discuss physical examination of victims of sexual assault;
16. describe relevant investigations and sample collection;
17. discuss the physical, psychological, and emotional toll of rape;
18. explain who is affected by domestic violence;
19. illustrate the healthcare implications of domestic violence;
20. list common risk factors and lethality issues for domestic violence;
21. recognise the signs and symptoms of domestic violence; and
22. describe appropriate documentation in cases of suspected domestic violence.

Course Contents
Evaluation of the gynaecologic patient. Gynaecologic history, gynaecologic physical examination, common laboratory tests in gynaecology, imaging techniques, surgical evaluation in gynaecology. Paediatric gynaecology, congenital anomaly of the female genital tract, intersex disorders, acquired gynaecological disorders of childhood. Endometriosis and adenomyosis, chronic pelvic pain, genital tract injuries, dilatation and curettage, acquired gynaetresia, intermenstrual, post coital and post-menopausal bleeding, ectopic gestation, displacements of the female genitalia. Medical ethics in gynaecology-historical perspective of medical ethics, forensic medicine and litigation in gynaecology, informed consent, sick leave, death certificate, abortion, rape, incest and gender-based violence.

OBG 503: Antenatal Care and Foetal Medicine (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define antenatal care and its concept, list the components of antenatal care and describe various forms of ANC;
2. discuss why various investigations are carried out on pregnant women during antenatal care;
3. explain how quality antenatal care leads to good pregnancy outcomes; and
4. demonstrate how to conduct proper antenatal care.

Course Contents
Protocol for antenatal care, nutrition in pregnancy, lie, presentation, position, attitude, engagement of the foetal presentations, the maternal pelvis, imaging in obstetrics, screening for congenital anomalies, prenatal diagnosis, drug use in pregnancy. Foetal growth and development. Antenatal assessment of the foetus. Intrapartum foetal assessment. Intrauterine foetal death (IUFD). Intrauterine growth restriction (IUGR). Foetal macrosomia. Pregnancy and labour in anencephalic and hydrocephalic foetuses. Rhesus isoimmunisation. Acute foetal distress. Disorders of the placenta. Umbilical cord and liquor. The newborn infant. Examination of the newborn. Asphyxia neonatorum. Other disorders and disease of the newborn. Birth injuries.

OBG 505: Obstetric and Gynaecological Emergencies (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define ectopic pregnancy and sites of ectopic pregnancy;

2. describe the clinical features of ruptured and unruptured ectopic pregnancies;
3. list the risk factors of ectopic pregnancy;
4. list the investigations of patients with ectopic pregnancies;
5. explain the medical, surgical and laparoscopic treatment of ectopic pregnancies
6. list the various definitions of postpartum haemorrhage (PPH);
7. explain the contribution of PPH to maternal mortality, enumerate the complications of PPH and enumerate the principles of managing PPH;
8. discuss the role of uterotonics including misoprostol in the management of PPH;
9. describe the role of active management of 3rd stage of labour in preventing PPH; and
10. list the complications of ruptured uterus.

Course Contents
Resuscitation in emergencies. Ruptured ectopic gestation. Incomplete miscarriage/abortion. Septic abortion. Post coital vaginal laceration. Bartholins cyst/abscess. Post partum haemorrhage. Ruptured uterus.

OBG 507: Gynaecological Clinic and Simulation Training (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate approach to the gynaecological patient in the clinic;
2. list symptoms and clinical signs in gynaecology;
3. describe history taking in gynaecology;
4. demonstrate general physical examination;
5. discuss pelvic examination, clinic based procedures and others; and
6. discuss pap smears, high vaginal swabs, cryosurgery, laparoscopy, hysteroscopy, colposcopy.

Course Contents
Approach to the gynaecological patient in the clinic. Symptoms and clinical signs in gynaecology. History taking in gynaecology. General physical examination. Pelvic examination. Clinic based procedures and others. Pap smears, high vaginal swabs. Cryosurgery. Laparoscopy. Hysteroscopy. Colposcopy.

OBG 509: Labour and its Complications, Operative Obstetrics, Newborn Baby Puerperium and its Abnormalities, Safe Motherhood (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define post-term and induction of labour;
2. describe incidence and recurrence of post-term;
3. enumerate the physiological changes and complications associated with post term;
4. describe interventions to reduce post-term, role of accurate pregnancy dating, sweeping of foetal membranes;
5. discuss the management of post-term labour induction versus expectant management, failed induction, role of foetal surveillance;
6. list the causes of obstructed labour and its clinical features;
7. describe the management including mode of delivery; and
8. list the complications of obstructed labour.

Course Contents
Physiology of labour. Management of labour including the use of the partogram. Induction of labour. Prolonged labour. Feto-pelvic disproportion and obstructed labour. Face, brow presentations and other malpositions. Obstetric injuries. Uterine rupture. Obstetric analgesia and anaesthesia. Instrumental delivery, forceps. Instrumental delivery, vacuum. instrumental delivery, destructive operations. Symphysiotomy, caesarean delivery. Management of the new-born baby. Management of the puerperium, episiotomy, postpartum haemorrhage, retained placenta, abnormal placental attachments, placenta accreta, increta, percreta, placenta praevia and acute uterine inversion. Sudden postpartum collapse. Puerperal pyrexia. Upper genital tract infections. Post-partum contraception. Safe motherhood initiative. Maternal mortality in Nigeria. Age and reproductive outcome. Parity and reproductive outcome.

OBG 511: Clinics, Theatre and Call Duty Bed Side Teaching I (6 Units C: LH 15; PH 225)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss clinical evaluation according to the contents of OBG 501, 503, 505, 507 and 509.

Course Contents
Clinical teaching according to the contents of OBG 501, 503, 505, 507 and 509. Layout of the antenatal clinic. Approach to the obstetric patient in the antenatal clinic. Health education of the pregnant woman. Registration/booking of the pregnant woman. History taking in of the pregnant woman. General physical examination. Physical examination of the pregnant uterus and its contents. Routine laboratory investigations. Clinical pelvimetry. Risk assessment of a pregnancy. Special clinical procedures, obstetric ultrasonography, X-ray pelvimetry. The postnatal clinic. Approach to the gynaecological patient in the clinic. Symptoms and clinical signs in gynaecology. History taking in gynaecology. General physical examination. Pelvic examination. Clinic based procedures. Pap smears, high vaginal swabs. Transabdominal and transvaginal ultrasonography. Diagnostic hysteroscopy. Colposcopy and treatment procedures. Hysterosalpingography.

PAE 501: Introduction to Paediatrics and Child Health (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate communication skills;
2. demonstrate detailed history taking and physical examination;
3. enumerate types of fluids and instruments/equipment used in paediatric practice;
4. list procedures in paediatric practice;
5. demonstrate setting up of intravenous fluid infusions, lumbar puncture, exchange blood transfusion, bone marrow aspiration; and
6. describe blood film for malaria parasite, urine, stool and cerebrospinal fluid.

Course Contents
Communication skills. History taking and physical examination. Fluids and instruments/equipment used in paediatric practice. Types of fluids, colloids, crystalloids, oral resuscitation, fluids and intravenous fluids, composition and uses of common oral fluids and intravenous fluids. Common instruments and equipment with practical bedside demonstration. Procedures in paediatric practice. Venepuncture, naso gastric tube insertion. Setting up of intravenous fluid infusions. Lumbar puncture. Exchange blood transfusion. Bone marrow

aspiration. Blood film for malaria parasite. Urine, stool and cerebrospinal fluid microscopy. Gram stain and chemistry.

PAE 503: Cardiovascular and Respiratory Disorders (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define the cardiovascular system;
2. enumerate the classification of CVS disorders;
3. enumerate the general examination findings of a child with cardiovascular lesion;
4. describe the examination of the peripheral pulses and blood pressure measurement;
5. explain jugular venous pressure measurement;
6. describe the examination of precordium;
7. describe the role of chest radiograph, ECG and echocardiography in the diagnosis of common CVS disorders;
8. identify clinical features of cyanotic heart disease;
9. define hypercyanotic spells;
10. describe acquired heart diseases, acute rheumatic fever, rheumatic valvular heart disease, cardiomyopathy, infective endocarditis, myocarditis, pericarditis, Kawasaki disease;
11. explain basic principle in history taking of the respiratory system and list steps in general physical examination and investigation relating to the respiratory system;
12. discuss classification of disorders of the upper airway;
13. define asthma, mechanism/pathophysiology, treatment, prevention, communication; and
14. describe the wheezing child.

Course Contents

Evaluation of the cardiovascular system, epidemiology and aetiology of common cardiovascular disorders. Classification of CVS disorders. General examination findings of a child with cardiovascular lesion. Examination of the peripheral pulses. Blood pressure measurement. Jugular venous pressure measurement, examination of the precordium. The role of chest radiograph, ECG and echocardiography in the diagnosis of common CVS disorders. Congenital heart disease I. Classification of acyanotic congenital heart diseases. Pathophysiology and clinical features of ventricular septal defects (VSD), atrial septal defects (ASD) and persistent ductus arteriosus (PDA). To recognise the peculiar clinical features of VSD, ASD and PDA. The role of chest radiograph, ECG and echocardiography in the diagnosis of VSD, ASD and PDA. Medical treatment, intervention cardiology and the role of surgery in the management of acyanotic heart disease. Congenital heart diseases II. Classification of cyanotic congenital heart diseases. Pathophysiology and clinical features of cyanotic congenital heart diseases. To recognise the peculiar clinical features of tetralogy of fallot (TOF). Clinical features and management of hypercyanotic spells. The role of chest radiograph, ECG and echocardiography in the diagnosis of TOF. Typical chest radiograph, ECG and ECHO findings of common cyanotic CHDs. Medical treatment, intervention and the role of surgery in the management of cyanotic congenital heart disease. Heart failure in infancy and childhood, definition, pathophysiology, signs and symptoms, causes by age, management. Acquired heart diseases, acute rheumatic fever. Rheumatic valvular heart disease. Cardiomyopathy. Infective endocarditis. Myocarditis. Pericarditis. Kawasaki disease. Evaluation of the respiratory system, brief anatomy and physiology of the respiratory system. Basic principle in history taking of the respiratory system. Steps in general physical examination relating to the respiratory system. Examination of the respiratory system. Investigation of the respiratory system. Communication. Disorders of the upper respiratory tract. Definition of the upper airway. Classification of disorders of the upper airway. History and common clinical presentations, investigations, communication. Asthma and chronic

respiratory disorders. Definition of asthma, mechanism/pathophysiology, history taking/presentation, investigation, treatment, prevention, communication. The wheezing child.

PAE 505: Gastrointestinal and Genitourinary System (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the epidemiology and aetiology of diarrhoea;
2. explain the pathophysiology of watery diarrhoea dehydration and rehydration;
3. describe the assessment of the patient with diarrhoea;
4. list complications of diarrhoea diseases;
5. discuss treatment of dehydration in patients (iso, hypo, hyper natraemic), hypo kalaemia and base deficit /acidosis;
6. explain the association between diarrhoea and malnutrition;
7. enumerate the strategies for control and prevention of diarrhoea;
8. describe review of physiology of fluid distribution and electrolytes in children;
9. list the fluid types and uses in paediatrics;
10. describe the principle of fluid therapy in paediatrics;
11. differentiate dehydration and other disorders of fluid in paediatrics;
12. enumerate the common electrolyte disorders in children and how to correct them;
13. differentiate acid base balance and disorders;
14. define UTIs;
15. enumerate the aetiology, risk factors, and different forms of presentation of UTIs;
16. discuss the pathogenesis of UTIs; and
17. describe the diagnosis and management of UTIs.

Course Contents

Gastrointestinal system. Diarrhoea, definition, mechanisms of diarrhoea, classification of diarrhoea. Aetiology, clinical features, evaluation, complications, treatment and prevention. Vomiting in children, causes, evaluation of a child with vomiting, complications, treatment. Fluid imbalance, peculiarities of fluid and electrolyte homeostasis in children. Dehydration, types of dehydration, severity of dehydration. Assessment of hydration status of children. Complications of dehydration. Management. Electrolyte imbalance, causes of electrolyte imbalance in children. Clinical features and management of various types of electrolyte imbalance- hyponatraemia, hypernatremia, hypokalaemia, hyperkalaemia, acidosis, alkalosis, hypochloraemia, hyperchloremia. Oral rehydration therapy, what is ORT, mechanism of action of ORT, types of ORT. Composition of ORS and its uses. Jaundice, definition, causes. Evaluation of a child with jaundice. Hepatitis, definition, aetiology, acute and chronic hepatitis. Hepatic encephalopathy, clinical manifestations, interpreting laboratory features, complications, treatment and prevention. Intestinal parasites, types, life cycle, modes of transmission, clinical features, impact of intestinal parasites on child health, complications, treatment and prevention. Abdominal pain. Acute abdomen. Chronic abdominal pain, aetiology, evaluation of a child with abdominal pain. Interpreting laboratory and imaging studies, Treatment. Malabsorption, definition, classification, diseases associated with malabsorption, consequences of malabsorption, evaluation, investigating children with malabsorption of carbohydrates, fats, proteins and other nutrients, treatment. GIT bleeding, classification, upper and lower GI bleeding. Evaluation and resuscitation of a child with GI bleeding, treatment. Oedema and ascites, pathophysiology, aetiology, evaluation, management. Genitourinary, evaluation of urogenital system, brief anatomy and physiology of the urogenital system, history suggestive of disorders of the system, examination of the urogenital system, examination of the urine, investigations required in evaluating urinary

system disorders. Evaluation of the glomerular filtration rate. Nephritic and nephritic syndrome, definition of nephrotic syndrome, Pathogenesis of nephrotic syndrome. Aetiology of nephrotic syndrome, clinical features. Work up of suspected cases, management, Complications of nephrotic syndrome, outcome/prognosis. Acute glomerulonephritis (AGN); Introduction with definitions. aetiology of acute glomerulonephritis. Prototype-post-streptococcal AGN, pathophysiology of AGN. Clinical features. work up of suspected cases, Management. Outcome/prognosis. Acute kidney injury and end stage renal disease. Definition of AKI, aetiology and classification of AKI, pathophysiology of AKI, clinical presentation, investigation, management. Chronic kidney disease (CKD) definition, aetiology and classification of CKD, pathophysiology of CKD, clinical presentations. Work up of suspected cases, management. Urinary tract anomalies and infections. Introduction and levels of CAKUTs. Types of CAKUTs, pathogenesis, clinical presentation. Specific types, posterior urethral valves (PUVs) and vesicoureteric reflux (VUR), types, clinical presentations, management. Urinary tract infections (UTIs), definition, aetiology and risk factors for UTIs, forms of presentation. Pathogenesis. Diagnosis of UTI. Management. Haematuria and proteinuria. Pathophysiology, causes, evaluation, management.

PAE 507: Endocrine and Metabolic Disorders (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define disorder of sexual development (DSD) and list the types of DSD;
2. describe the normal thyroid gland physiology;
3. list the functions of thyroid hormone and enumerate different types of thyroid disorders;
4. describe the work up of thyroid disorders and outline the management of thyroid disorders;
5. list the types of vitamin D and discuss the metabolism of vitamin D;
6. list the sources of vitamin D and describe the action of vitamin D;
7. discuss the aetiology of vitamin D deficiency;
8. explain the clinical history and examination that suggest a diagnosis of diabetes mellitus;
9. list the risk factors for developing type 1 and 2 diabetes;
10. outline the diagnoses of diabetes mellitus;
11. explain how to order appropriate confirmatory diagnostic serum and urine tests for diabetes mellitus;
12. describe the insulin preparations;
13. enumerate the treatment regimens for patients with type 1 and 2 diabetes;
14. outline the diagnosis of ketoacidosis;
15. enumerate the laboratory investigations for ketoacidosis;
16. explain the treatment of ketoacidosis;
17. enumerate the complications of diabetes mellitus;
18. describe plan for monitoring patients with diabetes;
19. define rickets and discuss the aetiology and pathogenesis of rickets; and
20. enumerate the clinical features, investigation and treatment of rickets.

Course Contents

Ambiguous genitalia/disorders of sexual differentiation and maturity. Definition of DSD. Types of DSD. Clinical features. Investigations. Management. Thyroid disorders. Types, Metabolism and Sources of vitamin D. Action of vitamin D. Definition of vitamin D deficiency.
Aetiology of vitamin D deficiency. Effects of vitamin D deficiency. Diabetes mellitus. Definition of diabetes mellitus, types of diabetes mellitus, clinical history and examination that suggest a diagnosis of diabetes mellitus. Risk factors for developing type 1 and 2 diabetes. Diagnoses of diabetes mellitus. Order appropriate confirmatory diagnostic serum and urine tests for

diabetes mellitus. Insulin preparations. Treatment regimens for patients with type 1 and 2 diabetes. Definition of diabetic ketoacidosis. Diagnosis of ketoacidosis. Laboratory investigations for ketoacidosis. Treatment of ketoacidosis. Complications of diabetes mellitus. Plan for monitoring patients with diabetes. Metabolic Rickets and vitamin D disorders. Normal thyroid gland physiology. Functions of thyroid hormone. Different types of thyroid disorders. Clinical features of thyroid disorders. Work up of thyroid disorders. Management.

PAE 509: Neonatology and Genetics (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. list aetiologic agents and risk factors of pertussis;
2. describe epidemiology of pertussis;
3. enumerate the phases of pertussis and clinical features;
4. list differential diagnosis of pertussis;
5. describe diagnosis and management of pertussis;
6. enumerate prevention of pertussis using the 5 levels of prevention;
7. identify the aetiologic agent of polio;
8. identify the risk factor for polio virus infection;
9. enumerate the forms of polio infection, clinical features and differential diagnosis;
10. manage polio and discuss prevention of polio using the 5 levels of prevention;
11. list the aetiologic agent of tetanus;
12. enumerate the types of tetanus;
13. describe the pathology and pathophysiology of tetanus;
14. recognise the clinical features of tetanus and list its differential diagnosis;
15. describe the principles of management of tetanus;
16. enumerate the prevention of tetanus using the 5 levels of prevention;
17. explain genetic counselling; and
18. discuss common chromosomal abnormalities.

Course Contents

Introduction to neonatology and vital statistics. Normal newborn and changes at birth. Outsized baby. Preterm, low birth weight. Macrosomia definitions, problems and management. Neonatal sepsis and tetanus. Common neonatal metabolic problems, introduction, pathophysiology, hypoglycaemia, hypocalcaemia, hypomagnesemia. Prenatal diagnosis and genetic counselling. Common chromosomal abnormalities, introduction, review physiology.

PAE 511: Specific Infectious Diseases (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe aetiology of measles infection;
2. enumerate the risk factors/epidemiology of measles infection and identify measles rash;
3. list the clinical phases of measles infection and features in each phase;
4. list differential diagnosis of measles;
5. assess and manage a child with measles;
6. enumerate prevention of measles using the 5 levels of prevention;
7. define and classify TB infection;
8. describe the basic pathology/pathophysiology and natural history of TB;
9. recognise clinical features suggestive of TB in children;
10. describe investigation and diagnosis of TB;
11. list drugs in management of TB and possible side effects;

12. enumerate principles of management of TB, DOTS;
13. describe prevention and control of TB using the 5 levels of preventions;
14. describe the pathogenesis and natural history of HIV infection in children;
15. categorise HIV infected children based on rate of disease progression;
16. list the factors that influence disease progression;
17. discuss diagnosis of HIV infection and stage the disease in children;
18. outline the criteria and methods for laboratory diagnosis of HIV in children;
19. describe the national algorithm for early infant diagnosis of HIV infection and PITC; and
20. explain the pharmacology of anti-retroviral therapy in children.

Course Contents

Malaria in children, severe malaria, introduction, epidemiology, pathophysiology, types of malaria. Clinical features, diagnosis of malaria, Management. Prevention, control. Infectious diseases. Measles, aetiology, risk factors, epidemiology, pathology, pathophysiology, clinical phases, features of measles (Koplik spots, rash distribution, common complications) evaluation and management of measles, prevention 5 levels of prevention, vaccine. Pertussis, aetiology, epidemiology and transmission pathology, pathophysiology of pertussis, phases, clinical features, investigation, making diagnosis, differentials, complications and management, prevention. Polio, aetiology, epidemiology and risk factors, pathology, pathophysiology of polio, forms of polio virus infection, clinical features of polio virus infection, differential diagnosis, investigation, diagnosis, complications of polio infection, management, prognosis, prevention. Tetanus, aetiology, types of tetanus infection, pathology, pathophysiology of tetanus infection, clinical features, differential diagnosis, complications, principles of management, treatment, prevention of tetanus. Tuberculosis, introduction and epidemiology. Pathology, pathophysiology. Natural history of tuberculosis, wallgren timetable. Peculiarities of TB in children. Investigations, diagnosis. principles of management. Dots prevention and control using the 5 levels of prevention. Paediatric HIV and AIDS, epidemiology and burden of paediatric HIV. Course of HIV disease. Viral & immunological dynamics. Clinical features of paediatric HIV. Clinical and immunological staging. Diagnosis. Testing algorithm <18, >18 months. Care of the HIV exposed child. Antiretroviral treatment. Schistosomiasis.

PAE 513: Clinics, Call Duty and Bed Side Teaching I (5 Units C: LH 15; PH 180)

Learning Outcomes

At the end of this course, students should be able to:

1. conduct clinical evaluation, ward rounds and calls according to the contents of PAE 501 to 513.

Course Contents

Clinical evaluation, ward rounds and calls according to the contents of PAE 501 to 513. Introduction to paediatrics. Evaluation of the cardiovascular system, epidemiology and aetiology of common cardiovascular disorders. Gastrointestinal and genitourinary system. Endocrine and metabolic. Neonatology and genetics. Specific infectious diseases.

COM 501: Epidemiology and Principles of Control of Communicable Diseases and Epidemic Diseases of Global Importance (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe principles of prevention and control of communicable diseases;
2. explain disease control, elimination, eradication, surveillance (disease notification, DSN);

3. discuss epidemiology and control of major endemic diseases in Nigeria including those transmitted by or through the following routes, ingestion (facco-orally), inhalation (airborne), vector-borne, contact, zoonotic diseases;
4. describe epidemiology and control of some important diseases in Nigeria (malaria, cholera, tuberculosis, HIV, Onchocerciasis, Schistosomiasis, HIV);
5. illustrate the WHO special programme for tropical diseases; and
6. enumerate control of diseases of global importance (Ebola, COVID-19).

Course Contents
Principles of prevention and control of communicable diseases (incubation period, quarantine, isolation). Epidemiology and control of major endemic diseases in Nigeria including those transmitted by or through the following routes. Ingestion (facco-orally), inhalation (airborne), vector-borne, contact, zoonotic diseases. Disease control, disease elimination, disease eradication, disease surveillance (disease notification, DSN), Epidemiology and control of some important diseases in Nigeria (malaria, cholera, tuberculosis, HIV, Onchocerciasis, Schistosomiasis, HIV). The WHO special programme for tropical diseases. Control of diseases of Global importance (Ebola, COVID-19).

COM 503: Epidemiology and Principle of Control of Non-communicable Diseases, Chronic Diseases and Cancers of Global Importance (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe principles of prevention and control of non-communicable diseases;
2. identify latent period, risk factor, causal and no causal association;
3. describe epidemiology and control of common NCDs in Nigeria including hypertension, obesity, diabetes mellitus, cardiovascular diseases, stroke, sickle cell disease, SCD, asthma/COPD, RTAs, common cancers, mental disorders;
4. list risk factors associated with NCDs including lack of physical activities, unhealthy dietary habits, alcohol, cigarette smoking, lifestyle; and
5. discuss legislative aspect of control of NCDs.

Course Contents
Principles of prevention and control of non-communicable diseases. Latent period, risk factors, causal and no causal association. Case control studies. Epidemiology and control of common NCDs in Nigeria including, hypertension, obesity, diabetes mellitus, cardiovascular diseases, stroke. Sickle cell disease (SCD), asthma/COPD. RTAs, common Cancers. Mental disorders. Risk factors associated with NCDs including lack of physical activities, unhealthy dietary habits, alcohol, cigarette smoking (tobacco), lifestyle. Legislative aspect of control of NCDs.

COM 505: Global Health and Role of Non-Government Health Organisations (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe origins and development of international health up to the second world war;
2. define the World Health Organisation;
3. explain international health regulations;
4. enumerate the establishment, objectives and operations of the TDR Programme; and
5. identify other governmental and NGOs involved in international health.

Course Contents
Origins and development of International Health up to the second world war. The World Health Organisation (WHO), its establishment, objectives, organisational structure, functions and challenges. International health regulations. The establishment, objectives and operations of the TDR Programme. Other governmental and NGOs involved in international health. Port health services. United Nations high Commission in Refugees (UNHCR). The Red Cross and Red Crescent.

COM 507: Health Research Ethics and Ethics of Good Medical Practice and the Role of Medical and Dental Council of Nigeria (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define health research ethics;
2. explain history of the evolution of medical ethics;
3. describe Belmont report, Helsinki declaration, Geneva declaration;
4. enumerate ethics of medical research involving human subjects;
5. list principles of research ethics;
6. identify ethics of good medical practice;
7. illustrate the doctor and the law judicial, coroner's court;
8. describe physician and patient relationship, including female patient;
9. describe professional conduct including industrial actions/activities;
10. identify Hippocratic oath and end of life issues, euthanasia;
11. appreciate informed consent and confidentiality;
12. illustrate aspects of drug treatment;
13. explain aspects of sexuality and reproduction;
14. discuss genetic disorder, organ transplant, cloning and genomics, parental diagnosis;
15. list composition and functions of Medical and Dental Council of Nigeria; and
16. describe code of conduct of MDCN.

Course Contents
Health research ethics, history of the evolution of medical ethics, Belmont report, Helsinki declaration, Geneva declaration. Ethics of medical research involving human subjects, principles of research ethics. Ethics of good medical practice. International code for medical ethics, reports and certification, medical documentation. The doctor and the law, judicial, coroner's court, physician and patient relationship, including female patient, professional conduct including industrial actions/activities. Hippocratic oath and end of life issues, (euthanasia). Informed consent and confidentiality. Human rights instruments related to health. Aspects of drug treatment. Aspects of sexuality and reproduction. Genetic disorder. Organ transplant. Cloning and genomics, parental diagnosis. The Medical and Dental Council of Nigeria (MDCN), composition and functions, education and discipline. Code of conduct of MDCN.

COM 509: Environmental and Occupational Health Practices and Role of Medical Officer of Health (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe environmental and occupational health practices;
2. identify environmental pollution through air, noise, water, tradition and industries;
3. define food hygiene, food borne diseases and food poisoning;
4. identify parasites of public health importance and their control;

5. describe water treatment plant, sewage treatment plants, food processing factories, markets, hotels and restaurants;
6. define occupational health services;
7. explain role of medical officer of health;
8. identify coordinator/director of primary health care services and head of health workers at LGA level;
9. discuss administrative functions, budgeting for health services, relationship with LGA; and
10. describe collaboration with the state ministry of health management board.

Course Contents
Environmental and occupational health practices. Urbanisation and health. Environmental pollution through air, noise, water, tradition and industries. Food hygiene (food borne diseases and food poisoning). Vector control, parasites of public health importance and their control. Guided visits to important places of public health providing environmental health services. Water treatment plant, sewage treatment plants, food processing factories, markets, hotels and restaurants, occupational health services. Role of medical officer of health (MOH). Coordinator/director of primary health care (PHC) services at LGA level, head of health workers at LGA, administrative functions, budgeting for health services, relationship with LGA administrative and legislative leadership, technical functions, organisation of PHC services, supervision and evaluation of all the health programmes in the LGA, training and manpower development for health workers in the LGA, adviser to the LGA chairman and HOLGA on health and other related matters, collaboration with the state ministry of health management board.

COM 511: Descriptive and Inferential Statistics (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. state the role of statistics in human biology and medicine;
2. describe collection and organisation of data and scales of measurement;
3. enumerate measures of central tendency and location;
4. enumerate measures of variability (dispersion) and standard deviation standard error;
5. define probability theory and binomial distribution;
6. explain the statistical significance of a difference;
7. define estimating population values;
8. illustrate planning of health survey; and
9. explain design and interpretation of clinical trials.

Course Contents
Introduction into the role of statistics in human biology and medicine. Collection and organisation of data, and scales of measurement. Presentation of data. Measures of central tendency and location (mean, median, mode, normal curve, skewed curve). Measures of variability (dispersion) and standard deviation (SD) standard error (SE). Probability theory and binomial distribution. Introduction of students to t-test, z-test, chi-square test. The statistical significance of a difference. Association, correlation and linear regression. Estimating population values. Planning of health survey. Design and interpretation of clinical trials.

COM 513: Public Health Administration and Management, National Health Policy, Healthcare Financing and Health System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe history of health services administration in Nigeria;

2. discuss Nigeria health system and organisation of health services;
3. enumerate comparative analysis of health care systems in different countries;
4. define the health team;
5. explain management of human, materials and financial resources;
6. enumerate population policies and poverty;
7. explain national health policy/national health Act;
8. define healthcare financing;
9. describe healthcare as a commodity; and
10. explain health insurance, the NHIS, community based insurance.

Course Contents
History of health services administration in Nigeria. Nigeria health system and organisation of health services. Concepts, principles and functions of management. Comparative analysis of health care systems in different countries. The health team. The health planning Process. Management of human, materials and financial resources. Population policies and poverty, Evaluation of Health Services, National health policy/national health Act. National health strategy. Healthcare financing. Introduction to healthcare financing. Demand for healthcare and services. Healthcare as a commodity. The economics of healthcare. Options of healthcare financing. Health insurance. The NHIS. Community based insurance.

COM 515: Community Health Project and the Role of Laboratory in Community Health Field Practice and Urban Community Health Field Posting (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct urban community health posting in selected primary and secondary health facilities and private owned health institutions; and
2. conduct community health research project on approved topics, supervised by faculty staff and assessed by a group of faculty teachers.

Course Contents
Urban community health posting in selected primary, secondary health facilities and private owned health institutions. Community health research project on approved topics, supervised by faculty staff and assessed by a group of faculty teachers. Public health laboratory service, organisation and functions in primary healthcare services. Endemic diseases clinic.

FAM 501: Family Structure and Role in Health (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe basic principles of family medicine;
2. list types of family;
3. explain patterns of illness and behaviour presenting to the family physician;
4. describe family medicine tools;
5. illustrate the role of the family physician in the society;
6. enumerate principles and use of the bio-psychosocial model of care;
7. identify differences between illness and disease, family models, effects of the illness of the index patient on their family;
8. describe functional and dysfunctional family;
9. define WONCA/ICPC;
10. explain family medicine tools;

11. enumerate generational risks and infectious diseases from travel;
12. describe HIV staging and commencement of ART/opportunistic infections; and
13. appreciate applied medical sciences clinical attachment at GOPD.

Course Contents
Introduction to family medicine. Scope of family medicine. Basic principles of family medicine. Overview of family dynamics (to include definition of family, family types and structure, family tasks and functions, impact of the family in health and disease). Patterns of illness and behaviour presenting to the family physician. Family medicine tools. Introduction to the role of the family physician in the society. Principles and use of the bio-psychosocial model of care. Difference between illness and disease. Family models. Effects of the illness of the index patient on their family. Functional and dysfunctional family. WONCA/ICPC. Family medicine tools. Generational risks and infectious diseases from travel. HIV staging and commencement of ART/opportunistic infections. Applied medical sciences clinical attachment at GOPD.

FAM 503: Private Practice Organisation (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe family medicine tools;
2. explain comprehensive and coordinated care and define patient centered approach;
3. define primary care management and explain community oriented care;
4. demonstrate biopsychosocial dimensions of holistic care communication and interview skills;
5. differentiate interrelation of curative and preventive care;
6. appreciate the place of the family physician in the national health system;
7. identify family health beliefs and practices;
8. explain two-way referral system;
9. describe the NHIS cost of health care to the family; and
10. discuss home visits.

Course Contents
Family medicine tools. Comprehensive and coordinated care. Patient centered approach. Primary care management. Community oriented care. Biopsychosocial dimensions of holistic care Communication and interview skills. Interrelation of curative and preventive care. The place of the family physician in the national health system. Family health beliefs and practices. Two-way referral system. The NHIS cost of health care to the family. Home visits.

FAM 505: Private Practice Organisation/Ethics of Medical Practice (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate the structure of medical services, voluntary agencies, private organisations and their inter-related nature;
2. describe medical administration in hospitals and other health services;
3. define private practice management;
4. explain budgeting, accounting and health financing;
5. describe personnel management, the "health team";
6. illustrate medical records, health I family life cycle transitions;
7. discuss computers in primary care;
8. demonstrate medical problem solving algorithm;

9. identify palliative care service available in Nigeria and abroad;
10. discuss alternative medical practice, a critical review;
11. encourage attachment to an accredited GP; and
12. explain medico-legal matters and code of ethics.

Course Contents
The structure of medical services. Voluntary agencies. Private organisations and their inter-related nature. Medical administration in hospitals and other health services. Private practice management. Budgeting, accounting, and health financing. Personnel management, the "health team". Medical records, health I family life cycle transitions. Computers in primary care. Medical problem solving algorithm. The family in different cultural contexts. Palliative care service available in Nigeria and abroad. Alternative medical practice, a critical review. Attachment to an accredited GP. Medico-legal matters and code of ethics.

OBG 502: Reproductive Health and Family Planning (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define reproductive health;
2. identify and describe each component of reproductive health;
3. list types of hormonal contraception;
4. describe the various hormonal contraceptive and their indications and contraindication;
5. enumerate WHO medical eligibility criteria (MEC) for hormonal contraceptive;
6. explain which hormonal contraceptive is suitable for a particular patient;
7. prescribe appropriate hormonal contraceptives for patient;
8. illustrate counselling on hormonal contraceptives; and
9. list the various non hormonal contraceptive and their indications and contraindication.

Course Contents
Pelvic infections, the sexually transmitted diseases. Acute pelvic inflammatory disease, chronic pelvic inflammatory disease, other pelvic infections, spontaneous abortions. Induced abortions, legal and illegal. Population dynamics. Communication issues in family planning. Myths and rumours in family planning. Contraception and family planning. General considerations. Oral hormonal contraception. Intrauterine contraceptive devices. Surgical contraception (female, male), long acting hormonal contraceptives, barrier methods of contraception. Periodic abstinence. Natural methods. Management information system in family planning. Integrating family planning with other reproductive health services. Contraception in special needs. Family planning in adolescent. Post abortal care. Unmet needs in contraception. Gender based violence.

OBG 504: Obstetric Clinic and Simulation Training (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate approach to the obstetric patient in the clinic;
2. list symptoms and clinical signs in obstetric;
3. describe detailed history taking in obstetric;
4. demonstrate general physical examination; and
5. enumerate obstetric examination, clinic based procedures and others.

Course Contents
Approach to the gynaecological patient in the clinic. Symptoms and clinical signs in gynaecology. History taking in gynaecology. General physical examination. Pelvic examination. Clinic based procedures. Pap smears, high vaginal swabs. Cryosurgery, transabdominal and transvaginal ultrasonography. Diagnostic hysteroscopy, colposcopy, hysterosalpingography.

OBG 506: Gynaecological Oncology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe anatomy of the vulva, femoral triangle, vaginal region and lower abdominal wall, including blood supply, nerve distribution and lymph drainage of the region;
2. illustrate the epidemiology and aetiology of vulval cancer;
3. identify the histopathology of vulval cancer and list the principles of treatment of vulval cancer;
4. explain the benign, borderline and malignant lesions of the ovary regarding epidemiology;
5. enumerate cervical cancer incidence, precursors, natural history, and risk factors;
6. explain the epidemiology, aetiology and presentation of cervical cancer;
7. list staging of cervical cancer;
8. discuss how to conduct EUA, biopsy and staging;
9. list the treatment modalities in cervical cancer;
10. describe palliative care, prognosis and the prevention of cervical cancer;
11. list risk factors, available screening tests, diagnosis, prevention of ovarian cancer;
12. outline staging of malignant diseases, prognostic factors, methods of treatment and follow up;
13. describe the epidemiology of endometrial cancer;
14. discuss clinical presentation and diagnostic work up for patients with endometrial cancer; and
15. list treatment options for endometrial cancer.

Course Contents
Lesions of the vulva. Benign lesions of the vulva. Pre-malignant lesions of the vulva. Malignant lesions of the vulva. Pruritus vulvae. Disease of the vagina. Vaginal discharge, benign lesions of the vagina. Pre-malignant lesions, malignant lesions of the vagina. Disorders of the cervix, benign lesions of the cervix. Pre-malignant lesions of the cervix, malignant lesions of the cervix. Disorders of the Uterus, benign lesions of the uterus, pre-malignant lesions of the uterus. Disorders of the Ovary, ovarian neoplasms, evaluation of ovarian neoplasms, management of ovarian tumours. Gestational trophoblastic tumours, hydatidiform mole, choriocarcinoma. Chemotherapy and radiotherapy in gynaecologic practice. Chemotherapy in genital cancer. Radiotherapy in genital cancer.

OBG 508: Medical Disorders in Pregnancy (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list the various definitions and causes of anaemia in pregnancy;
2. explain the impact of anaemia in pregnancy on pregnancy outcome;
3. describe how to evaluate women with anaemia in pregnancy;
4. list the various management options of anaemia in pregnancy;
5. enumerate the classifications of heart disease in pregnancy;
6. explain how heart disease affect both maternal and foetal outcome;
7. describe how to evaluate women with heart disease in pregnancy;

8. recognise the need for prenatal fetal diagnosis;
9. enumerate the principles of patient care in pregnancy, labour and puerperium;
10. describe how thyroid disease can affect maternal and foetal outcome;
11. identify the need to modify drug treatment as some are teratogenic;
12. define the causative agent of HIV;
13. describe the transmission of HIV from mother to child during pregnancy, labour and after delivery;
14. enumerate drug therapy for HIV infection and describe the methods of prevention of mother to child transmission of HIV;
15. discuss breast feeding issues in infected mothers; and
16. illustrate how to monitor babies of infected mothers.

Course Contents

Anaemia in pregnancy. Heart disease in pregnancy. Malaria in pregnancy. Diabetes mellitus in pregnancy. Mental disorders in pregnancy and the puerperium. Human immunodeficiency virus (HIV)/AIDS in pregnancy, (Pathophysiology). The haemoglobinopathies in pregnancy. Disseminated intravascular coagulation (DIC). Obesity in pregnancy. Vomiting in pregnancy. Liver diseases in pregnancy. Viral infections in pregnancy. Other medical disorders in pregnancy. Surgical disorders in pregnancy.

OBG 510: Urogynaecology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define vesico-vaginal fistula and describe its epidemiology;
2. list the classifications of vesico-vaginal fistula;
3. describe the pathogenesis of vesico vaginal fistula, the aetiology and determinants of genital fistula;
4. list the clinical features and laboratory investigations, and the treatment options for fistula;
5. describe post operative care and prevention of fistula;
6. define recto-vaginal fistula;
7. describe aetiology, risk factors of recto vaginal fistula and the pathogenesis;
8. list the different types of RVF;
9. list the clinical features, describe the diagnosis, preoperative care and treatment of recto vaginal fistula;
10. define pelvic organ prolapse and describe the pathophysiology;
11. enumerate the classification (clinical) of pelvic organ prolapse based on the anatomic location;
12. list various staging methods of pelvic organ prolapsed;
13. describe simple classification (traditional) and Baden and Walker classification;
14. explain the aetiology/risk factors of pelvic organ prolapsed;
15. define the pelvic support system;
16. enumerate the history, examination and clinical findings in patients with pelvic organ prolapsed;
17. describe the prevention of pelvic floor prolapsed;
18. explain the differential diagnosis; and
19. describe the treatment of pelvic organ prolapse.

Course Contents

Anatomy of the urogenital system. Physiology of micturition. Urinary disorders. Genuine stress incontinence. Detrusor instability. Overflow incontinence and functional incontinence. Fistulae (vesico-vaginal) fistulae. Vesico-rectal fistulae. Uretero-vaginal fistulae. Recto-vaginal fistulae.

Vault prolapse. Anterior prolapse. Posterior prolapse. Cystocele. Rectocele. Psychological aspect of urogynaecology.

OBG 512: Complications in Pregnancy (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. list the various forms of hypertensive disorders of pregnancy;
2. differentiate between pre-eclampsia and eclampsia;
3. describe the effect of pre-eclampsia/eclampsia on fetal and maternal outcome;
4. list the signs and symptoms of eclampsia;
5. describe how to evaluate a patient with eclampsia;
6. explain the role of antihypertensives and anticonvulsants in the management of eclamptic patients;
7. illustrate the role of supportive care in management of patients with the conditions;
8. define antepartum haemorrhage (APH);
9. describe the different types of APH in terms of clinical presentations and the use of ultrasound in the diagnosis and management of APH;
10. define PROM;
11. explain the aetiology of PROM;
12. describe how to diagnose and manage cases of PROM.
13. define the various postpartum haemorrhage (PPH);
14. describe the contribution of PPH to maternal mortality;
15. list the complications of PPH;
16. explain the principles of managing PPH and the role of uterotonics including misoprostol in the management of PPH; and
17. describe the role of active management of 3rd stage of labour in preventing PPH.

Course Contents

Hypertensive disorders in pregnancy, pre-eclampsia/eclampsia. Antepartum haemorrhage. Placenta praevia. Antepartum haemorrhage. Placental abruption. Preterm labour and delivery. Cervical incompetence. Premature rupture of membranes. Cord prolapse. Multiple pregnancy. Breech presentation. Unstable and abnormal lies and presentations.

OBG 514: Reproductive Endocrinology and Fertility (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define amenorrhoea;
2. list the causes of amenorrhoea, investigations and treatment of primary amenorrhoea;
3. define secondary amenorrhoea;
4. enumerate the aetiology of secondary amenorrhoea, investigations and treatment modality in secondary amenorrhoea;
5. describe the physiology of menopause and the climacteric period;
6. list the hormonal changes at menopause, perimenopausal symptoms and treatment;
7. discuss female and male sexual dysfunction;
8. define rape;
9. describe epidemiology of infertility and explain male infertility; and
10. identify assisted reproductive techniques.

Course Contents

The menstrual cycle and associated disorders. The menstrual cycle. Primary amenorrhoea. Secondary amenorrhoea. Menorrhagia. Dysmenorrhea. Galactorrhoea. Hirsutism. Polycystic

ovarian disease. Intermenstrual, postcoital and postmenopausal bleeding. The climacteric. Sexuality. Physiology of coitus. Female sexual dysfunction. Male sexual dysfunction. Rape. Infertility. Epidemiology of infertility. Male infertility. Assisted reproductive techniques.

OBG 516: Clinics, Theatre and Call Duty Bed Side Teaching II (6 Units C: LH 15; PH 225)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss clinical evaluation according to the contents of OBG 501 TO 514.

Course Contents
Clinical evaluation according to the contents of OBG 502 TO 514. Reproductive health and family planning. Obstetric clinic/simulation training. Gynaecological oncology. Medical disorders in pregnancy. Urogynaecology. Complications in pregnancy. Reproductive endocrinology and fertility.

OBG 518: Gynaecological Endoscopy (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list the indications for laparoscopy, hysteroscopy and colposcopy; and
2. enumerate complications of laparoscopy, hysteroscopy and colposcopy.

Course Contents
Diagnostic laparoscopy, hysteroscopy and colposcopy.

PAE 502: Nutrition, Growth and Development (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. define normal growth and normal development;
2. list important milestones in growth and development;
3. describe behavioural disorders, enuresis and encopresis, temper tantrum, head banging, breath holding attacks, language delay/disorders/communication disorders, dyslexia, stuttering, clinical features management;
4. illustrate instruction on nutritional needs of normal children and those with disorders like protein-energy-malnutrition, marasmus, and micronutrient deficiencies;
5. enumerate technical skills of anthropometry and instructions on the use and value of the growth charts;
6. list factors affecting growth and development of children; and
7. describe over nutrition and associated problems.

Course Contents
Growth and development I. Normal growth. Normal development. Important milestones in growth and development. Primitive reflexes. Growth and development II. Behavioural disorders. Food fussiness. Enuresis and encopresis. Temper tantrum. Head banging. Breath holding attacks. Language delay/disorders/ communication disorders. Dyslexia, stuttering, clinical features management. Nutrition, attendance at the nutrition clinic is compulsory for instruction on the nutritional needs of normal children and those with disorders like protein-energy-malnutrition, marasmus and micronutrient deficiencies. Technical skills of anthropometry are taught and instructions on the use and value of the growth charts and on factors affecting growth and development of children are highlighted. Anthropometry. Factors

affecting growth and development. Failure to thrive babies and causes. Puberty, adolescence and its problem. Over nutrition and associated problems.

PAE 504: Child Health and Primary Care (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. list vaccine types and storage;
2. describe national programme on immunisation/schedule, implementation and challenges in Nigeria;
3. define poisons and examples;
4. list the clinical features of childhood poisoning-clinical toxidromes;
5. describe how to evaluate a patient with suspected childhood poisoning;
6. enumerate the principles of management of poisoning in children;
7. list the common childhood poisonings and how to manage them;
8. discuss dog and snake bite, epidemiology, clinical features, management;
9. define child abuse;
10. explain paediatric emergency;
11. discuss triaging in the emergency unit and how to recognise a paediatric emergency, urgent and non-urgent conditions in the emergency;
12. enumerate the principles of management of paediatric emergencies;
13. list the common paediatric emergencies and how to manage;
14. describe how to improve the case management skills of health workers and the health system work at the health facility level; and
15. describe how to improve family and community practice.

Course Contents
Immunisation, availability, awareness and implementation. Introduction, vaccine types and storage. National programme on immunisation/schedule. National immunisation days, implementation and challenges in Nigeria. Childhood poisoning. Definition of poisons and examples. Clinical features of childhood poisonings-clinical toxidromes. How to evaluate a patient with suspected childhood poisoning. Principles of management of poisoning in children. Common childhood poisonings and how to manage them. Dog and snake bite, epidemiology, clinical features, management. Non-accidental childhood injuries introduction, epidemiology, at risk groups, clinical presentation, evaluation of a suspected case, management, prevention. Child abuse; introduction, epidemiology, at risk groups, clinical presentation, evaluation of a suspected case, management, prevention. Paediatric emergencies, definition of paediatric emergency. Triaging and how to recognise a paediatric emergency, urgent and non- urgent conditions in the emergency. Principles of management of paediatric emergencies. Common paediatric emergencies and how to manage. Primary care. Diarrhoea training, demographic characteristics of children attending clinic and anthropometry. Clinical characteristics of children attending primary health care clinic. Talking to mothers about hygiene and illnesses. economic disposition of mother attending primary health care clinic. Triage in the primary health care clinic. Nutritional issues in primary health care. Integrated management of childhood illnesses (IMCI), background, rationale, components of the integrated approach. IMCI strategy. Benefits and limitations. IMCI case management process.

PAE 506: Paediatric Oncology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:

1. describe the solid tumours, non-hodgkin's lymphoma (burkitt's and non burkitt's), hodgkin's lymphoma, retinoblastoma, neuroblastoma, rhabdomyosarcoma, nephroblastoma;
2. enumerate the epidemiology of cancer age-related incidence and list the clinical presentations;
3. describe the diagnosis and staging; and
4. explain the treatment including chemotherapy and supportive care and prognosis.

Course Contents
Solid tumours I. Non-hodgkin's lymphoma (burkitt's and non burkitt's). Hodgkin's lymphoma. Retinoblastoma. Neuroblastoma. Rhabdomyosarcoma. Nephroblastoma. Epidemiology of cancer age-related incidence. Race-related incidence. Genetic factors. Chemical-related factors. Environmental factors. Clinical presentations, diagnosis and staging, treatment (chemotherapy, supportive care), prognosis, complications, late effects.

PAE 508: Diseases of Central Nervous System, Muscles and Bones (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe common aetiologies of CNS infections and list the symptoms and signs attributed to CNS infections;
2. list signs of meningeal irritation and list differential diagnosis;
3. assess suspected CNS infections;
4. list indications and contraindications to lumbar puncture;
5. enumerate complications of CNS infection and management of CNS infections;
6. describe the anatomy and physiology;
7. define osteomyelitis and septic arthritis;
8. discuss the pathophysiology of osteomyelitis/septic arthritis and describe the aetiology of osteomyelitis and septic arthritis;
9. enumerate the clinical features of osteomyelitis and septic arthritis;
10. describe the management; and
11. list the complications, outcome and prognosis.

Course Contents
Evaluation of central nervous system (CNS) infections. Acute bacterial meningitis. Tuberculous meningitis. Cerebral palsy and mental retardation. Cerebral palsy, definition aetiology, classification, clinical features, management, prognosis. Mental retardation, definition, prevalence, aetiology, predisposing factors, clinical presentation, risk of recurrence, prevention. Convulsions and seizure disorder, febrile seizure. Epilepsies, complications, management, prognosis. Coma definition, pathophysiology, grading of coma, Glasgow coma scale, diagnostic approach, investigations, treatment. Headaches in children, introduction, history taking, types of headache, migraine, tension. Intracranial hypertension.
Investigation, treatment, attention deficit hyperactivity disorder, variation in intelligence.
Overview of common aetiologic agents of CNS Infections bacterial, viral, others. Pathology/pathophysiology of CNS infections. Clinical features attributed to CNS infections, differential diagnosis. Evaluation/investigation of suspected CNS infection indications/contra indications to lumbar puncture. Complications, treatment/prognosis. Diseases of neuromuscular system. Osteomyelitis and septic arthritis, brief anatomy and physiology, definition of osteomyelitis and septic arthritis, pathophysiology of osteomyelitis and septic arthritis, aetiology of osteomyelitis and septic arthritis, clinical features of osteomyelitis and

septic arthritis, investigations, differential diagnosis, management, complications, outcome and prognosis. Orthopaedic problems in children.

PAE 510: Diseases of the Blood (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define haematopoietic system and describe the components of HS, blood cells, the bone marrow, and lymphoid organs;
2. illustrate the development of HS;
3. describe the evaluation of child with haematologic disorders,
4. explain epidemiology and pathogenesis;
5. enumerate the classification of thalassemia and describe the diagnosis of α- thalassaemia and β-thalassaemia;
6. list complications/late stages;
7. describe acute lymphoblastic leukaemia and acute myeloid leukaemia;
8. enumerate the classification of acute leukaemias and list the clinical features of acute leukaemia;
9. discuss principles of induction, consolidation and maintenance cytotoxic chemotherapy, including attendant side effects; and
10. explain the outcomes of leukaemia according to classification and prognostic indices.

Course Contents

Evaluation of haematopoietic system (HS). Definition of haematopoietic system. The components of HS (blood cells, the bone marrow, and lymphoid organs). Development of HS. Evaluation of child with haematologic disorders. Anaemia in children. General approach to anaemia. Introduction. Definition of anaemia. Patient characteristics-age of patient-sex-race and ethnicity. Evaluation-history-physical examination. Laboratory evaluation-complete blood count-haemoglobin and haematocrit-RBC indices-white blood count and platelet count-blood smear reticulocyte count. Haemoglobin electrophoresis, classification of anaemia, microcytic anaemia, normocytic anaemia, macrocytic anaemia, reticulocyte response. Confirmatory testing. Sickle cell disease and other haemoglobinopathies basic concept of SCD, definition, epidemiology. Pathogenesis/pathophysiology. Factors enhancing sickling. Haplotype. Sickle cell crises, vaso-occlusive pain episode, acute chest syndrome, stroke, hyper-haemolytic crisis, aplastic crisis, sequestration crisis, priapism, osteomyelitis, avascular necrosis, sickle cell nephropathy, sickle cell hepatopathy. Thalassemia, definition, epidemiology, pathogenesis, classification, diagnosis, α-thalassaemia, β-thalassaemia, overview clinical manifestations, early manifestations, skeletal changes, liver and gallbladder, splenomegaly, splenectomy, kidneys, management. Acute leukaemias, acute lymphoblastic leukaemia, acute myeloid leukaemia. classification of acute leukaemias integrating, morphology, cytochemistry, cytogenetics. Clinical features of acute leukaemia. Principles of induction, consolidation and maintenance cytotoxic chemotherapy, including attendant side effects. Outcomes of leukaemia according to classification, prognostic indices. Bleeding disorders, coagulation, mechanism of clotting, evaluation of abnormal coagulation tests, inherited coagulation disorders. Haemophilia a, haemophilia b, Von-Willebrand disease. Introduction. Definitions. Epidemiology, clinical manifestations, age at first bleeding, initial site of bleeding, intracranial bleeding, joints and muscle, epistaxis, oral, gastrointestinal bleeding, laboratory evaluation. Haemophilic arthropathy, development of inhibitors, diagnostic evaluation, patient and family history. Laboratory testing, screening tests, factor activity levels, genetic testing.

PAE 512: Clinics, Call Duty and Bed Side Teaching II (5 Units C: LH 15; PH 180)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation, ward rounds and calls according to the contents of PAE 501 to 513.

Course Contents
Clinical evaluation, ward rounds and calls according to the contents of PAE 501 to 513.

600 Level

DER 601: Dermatology (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate theoretical knowledge of dermatology;
2. list clinical skills in dermatology;
3. recognise common skin diseases especially in our environment; and
4. manage common skin diseases especially in our environment.

Course Contents
Physiology of the skin and appendages. Histochemistry of the skin. Superficial and deep fungal infection, bacterial infection of the skin including parasitic infection of the skin. Papulo-squamous skin disease. Connective tissue diseases. Common sebaceous gland diseases, Common non-infectious diseases of the hair. Dermatitis. Contact eczema. Toxic dermatitis. Dyshidrotic eczema. Viral infection of the skin, sexually transmitted diseases (including AIDS). Pigmentary skin disorders, external manifestation of systemic diseases. Management of skin disease in the community. Taking of skin scraping, staining slide for fungus identification, planting of scraping and swabs from the skin for culture, skin-snip for filarial diagnosis, read slides for fungal infection and other common parasitic infections of the skin. Take urethral and vaginal swabs correctly for microscopic and culture examination. Take skin biopsies correctly and preserve for histopathology.

DER 603: Dermatology Clinic (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation, ward rounds and calls according to the contents of DER 601.

Course Contents
Clinical evaluation, ward rounds and calls according to the contents of DER 601 in first semester.

ORL 601: Otology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe competence in typical clinical presentation of ORL, head and neck (HN) disease;
2. demonstrate detailed physical examination;
3. list the different symptoms and signs in differential diagnosis;
4. explain initial treatment and indications for referral; and

5. describe competence in typical clinical presentation of ORL-HNS emergencies.

Course Contents
Detail teaching in diagnosis and differentials of both common and uncommon otological disease, emergencies, their initial treatment and indications for referral. The required basic surgical principles of management and postoperative complications. The rehabilitation process, follow-up criteria. Acquaintance with the various preventive measures for some otological disease. Rhinology, detail teaching in diagnosis and differentials of both common rhinological disease, emergencies, their initial treatment and indications for referral. The required basic surgical principles of management and postoperative compilations. The rehabilitation process, follow-up criteria. Acquaintance with the various risk factors in the community, and knowledge of various preventive measures for some rhinological diseases.
Laryngology. Head and neck, details teaching in diagnosis differentials of both common and uncommon laryngological. Head and neck disease, emergencies, their initial treatment and indications for referral. The required basic surgical principles of management and postoperative complications. The rehabilitation process, follow-up criteria, acquaintance with various risk factors in the community and knowledge of various preventive measures for some laryngological, head and neck disease.

ORL 603: Clinic, Theatre and Ward Round Teaching (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate basic clinical or bedside examination of use of headlight, otoscopes, tuning fork minor examination;
2. conduct balance tests, ocular evaluations;
3. describe knowledge and skill in doing the supportive investigations of pure tone audiometry, caloric test with their clinical applications;
4. interpret results of investigations of radiology, haematology, biochemical with their clinical application;
5. list various risk factors in the community; and
6. explain preventive measures for some otorhinolaryngological diseases.

Course Contents
Diagnosis and management of ENT, HNS disease. Basic knowledge on how to investigate and interpret the results. Learning to identify problems, which are beyond level of skill, referral processes and skills for onward referral to a specialist, relevant hospital. Awareness of noise pollution as a health hazard for industrial workers, hearing conservation. Epidemiological surveys into prevalence of deafness in the community, with field trips into the community (perhaps via CBME in our case), Early screening test for ENT problems, universal neonatal hearing screening. Methods of seeking information on the web via ICT for the ORL disease and recent advances in the field of ORL practice. Revision of basic examination of the ear, nose and throat so as to be able to give first aid treatment to common ENT problems.

RAD 601: Lectures in Radiology (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. list the components of an X-ray unit and explain the process of X-ray generation;
2. describe the principles of fluoroscopy;
3. explain the principle of contrast in the different imaging modalities;
4. describe the physical basis of image formation of computed tomography;

5. discuss the scale of Hounsfield units (HU) and the principle of window centre and width;
6. describe the normal anatomy of the various organs on CT;
7. list the basic principles of image formation with MRI;
8. explain the safety issues in the MRI environment with regard to patients and staff;
9. describe the basic principles of image formation with ultrasonography and to list the tissue properties that determine it;
10. list the principles of the doppler effect;
11. discuss the basic infrastructure of imaging informatics, including picture archiving and communication systems (PACS) and radiological information systems (RIS);
12. enumerate the relative values of and indications for radiography and CT in chest imaging;
13. explain when to refer a patient to radiography, CT or MRI of the chest;
14. discuss imaging patterns in chest radiology including consolidations, nodules, hyperlucencies, hyperinflation;
15. describe the imaging appearance of pulmonary infections, TB, pneumonia and opportunistic infections related to HIV/AIDS;
16. enumerate the typical chest radiography appearances and common causes of pleural effusion, pneumothorax and tension pneumothorax;
17. explain the typical imaging appearances of bronchogenic carcinoma and pulmonary metastases on radiographs and CT; and
18. list the imaging signs of pulmonary embolism.

Course Contents

Introduction and overview of radiological sciences. Definition of radiology. Classification of radiology into diagnostic and interventional radiology. Introduction of the imaging equipment used in radiologic practice, X-ray machines, fluoroscopy machines, CT scan, magnetic resonance imaging, ultrasound scan machines, mammography machines, positron emission tomography, single photon emission computed tomography. The descriptive terminologies used in radiologic practice in ultrasound scan, hypo echogenicity, plain radiography and fluoroscopy, radionuclide imaging. Basic reactions and management of the different types of adverse reactions from the use of contrast media in radiologic practice. The radiology request form, how to properly fill a radiology request form. Overview of Chest radiology. Relative values of and indications for radiography and CT in chest imaging. Imaging patterns in chest radiology including consolidations, nodules, hyperlucencies, hyperinflation, opacification. Imaging appearance of pulmonary infections such as TB, pneumonia and opportunistic infections related to HIV/AIDS. Typical chest radiography appearances and common causes of pleural effusion, lung abscess, lung collapse, pneumothorax and tension pneumothorax. Typical imaging appearances of bronchogenic carcinoma and pulmonary metastases on radiographs and CT scan. Imaging signs of pulmonary embolism. Imaging features of chest trauma. Uro-genital radiology. Imaging modalities for evaluation of uro-genital disorders, these includes plain radiography (KUB), ultrasonography, intravenous urography (IVU), micturating cysto-urethrography (MCUG), retrograde urethrography (RUG), CT urography, Hysterosalphingography (HSG), Vasography, Flush genito-graphy. Relative values of and indications for radiography, ultrasonography, CT and MRI in urogenital radiology. Contrast medium management in renal failure. Imaging features of the most common diseases of the kidneys and of the urinary tract which include both congenital and acquired, benign and malignant, infections/infestations, pyelonephritis, renal abscess, schistosomiasis, uro-genital TB. Imaging features of some common congenital urological anomalies, posterior urethral valves, congenital hydronephrosis, renal agenesis, different types of ectopic kidneys, ureterocoeles. Benign renal lesions, simple renal cysts, polycystic kidney diseases, classifications of the different types of renal cystic disorders. Imaging features of common rental and bladder tumours as are seen on the contrast studies, CT scan, Ultrasound scan, MRI. Imaging features of trauma to the uro-genital systems especially trauma to the kidneys

and the urinary bladder. Imaging features of the most common pathologies of the prostate, urinary bladder, urethra (urethral strictures), seminal vesicles and testes- ranging from infections/infestations to tumours, benign and malignant. Introduction to interventional procedures in uro-genital radiology such as percutaneous nephrostomy. Nephrolithotomy. Ureteral stenting. Balloon dilatation of ureteral stricture. Lithotripsy. Extra corporeal wave lithotripsy (ECWL). Ultrasound guided drainage of renal cystic lesions including abscesses. CT/MRI guided biopsies. Paediatric radiology. Radiology in obstetrics. Gynaecology and women imaging. Cardio-vascular radiology. Abdominal radiology. Interventional radiology. Musculo-skeletal radiology. Neuro-radiology and ENT radiology.

RAD 603: Radiology Procedures and Results Interpretation (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. demonstrate barium meal and follow through, barium enema, IVU, HSG, MCUG, RUG;
2. list common features of peptic ulcers affecting the duodenum, gastric ulcers and tumours;
3. interpret chest radiographs with a view to identify common lesions, consolidations, pleural fluid collections, pneumothorax, mediastinal shift;
4. discuss ultrasound features of diseases of some of the organs in the body, liver, pancreas, gall balder, appendix, colonic tumours;
5. list the indications and some basic technique of some of the systems of the body;
6. enumerate the indications and interpretations of common neurological disorders, head injury to interpret different types of skull fractures and intra cranial hematoma;
7. identify what mass effect on CT scan images is;
8. differentiate cystic lesions from solid lesions on ultrasound scan;
9. list some instruments used in interventional radiology such as the cannula, guide wires, stents, coils; and
10. appreciate the basic technique for ultrasound guided biopsies and drainage procedures.

Course Contents

Practical basis of some basic radiographic procedures, barium meal and follow through. Barium enema, IVU, HSG, MCUG, RUG. The common features of peptic ulcers affecting the duodenum, gastric ulcers and tumours. Chest radiographs with a view for identifying common lesions, consolidations, pleural fluid collections, pneumothorax, mediastinal shift. Ultrasound features of diseases of some of the organs in the body such as liver, pancreas, gall balder, appendix, colonic tumours. The indications and some basic technique of some of the systems of the body, the technique of HSG, IVU, RUG, MCUG, barium meal and follow through, barium enema, barium swallow, the indications and interpretations of some common neurological disorders, head injury. Different types of skull fractures and intra cranial hematoma. Mass effect on CT scan images. Cystic lesions from solid lesions on ultrasound scan. Some instruments used in interventional radiology, the cannula, guide wires, stents, coils. The basic technique for ultrasound guided biopsies and drainage procedures.

ORT 601: Principles of Orthopaedic Surgery (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. enumerate the general approach to an injured patient and the various steps to be taken;
2. define what fracture, causes, classification, principles of managements;
3. discuss about missile and blast, the injuries they cause and the approach to patient management;

4. explain amputation, indications, preparing patient for surgery;
5. list principles of management of hand injuries and the principles of hand infections;
6. list compartment syndrome especially the danger signs and how to prevent them;
7. explain the basis of congenital talipes equinovarus deformity and its management; and
8. list fundamentals of congenital hand abnormalities and bone tumours.

Course Contents
Clerking in orthopaedics, examination where appley's principles of look, feel and move are emphasised. Management of multiply injured patient. Management details, both field and hospital management, ATLS protocol of resuscitation and then a good secondary survey to outline the various injuries which aid planning of definitive management. Management is multi-disciplinary. Fracture management. Missile and blast injuries. A list of injuries according to systems is given. Management highlights triaging patient in mass casualty situations and then following ATLS protocol for resuscitation. Principles of amputation. Diagnosis of the patient disease, resuscitation and preparation for surgery with emphasis on consent taking. A highlight of other pre-op, intra-op and op management is given as well as complications and how to prevent or manage them. Preventive measures on amputation. Spinal injured patient. Acute and chronic osteomyelitis, acute osteomyelitis. Chronic osteomyelitis. Bone metabolism especially the role of vitamin D, parathyroid hormones, calcitonin among others, the various diseases affecting these processes such as rickets, osteomalacia are discussed. Tuberculous arthritis and Pott's disease. Hand infections. Hand injuries. The anatomy and functions of the hand. Prosthesis are all discussed. Compartment syndrome and VIC. Various causes like tight splint, close fractures and even open fractures. Congenital talipes equinovarus (idiopathic vs syndromic). Treatment or early referral at birth or soon afterwards to commence serial manipulation and casting which is the mainstay of treatment. Congenital hand abnormalities. Bone tumours.

ORT 603: Clinics, Theatre and Bed Side Teaching in Orthopaedics
(3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate adequate detailed history taking;
2. demonstrate physical examination;
3. outline investigations; and
4. make diagnosis where feasible.

Course Contents
The topic is introduced, its definition, epidemiology, aetiology and classification. Clinical evaluation and investigation. Treatment, medical therapy and surgery for indicated cases. Patients on visitation to the clinics, the evaluation methods as well as treatment. Patient being operated upon. Short and long presentation. The art resuscitation, primary survey.

ORT 605: Tutorials in Orthopaedics (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. make presentations on specific topics as drawn in a roster and in the presence of a lecturer as a moderator.

Course Contents
Specific topics are drawn in a roster and students present in the presence of a lecturer as a moderator.

OPT 601: Introductory Ophthalmology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe basic ocular anatomy and physiology;
2. demonstrate history taking;
3. measure and record visual acuity;
4. test for direct, consensual, and afferent pupillary reflexes;
5. explain and perform direct ophthalmoscopy;
6. discuss normal fundus appearance of the optic disc, macula and major blood vessels;
7. demonstrate knowledge of ocular pharmacokinetics routes of applications of ophthalmic medications;
8. describe the direct ophthalmoscope for fundoscopy; and
9. apply eye drops and ointments.

Course Contents
Basic anatomy and physiology of eye and orbit. Basic anatomy of vitreous and retina, symptoms suggestive of vitreoretinal diseases (flashes, floaters, blurring, distortions, abrupt or progressive dimming of vision, abrupt or progressive loss of peripheral visual field in one eye). Examination of the normal fundus with direct ophthalmoscope. Fundus features of important systemic diseases (diabetic, hypertension). The red eye. Painful/painless acute vision loss. Ocular injuries. Chemical burns.

OPT 603: Cornea, External Eye Diseases, Lacrimal System, Orbit (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss basic anatomy of lids, conjunctiva, cornea, lacrimal system, upper, orbit;
2. assess corneal clarity with pen torch;
3. demonstrate knowledge of causes of red eye symptoms associated with red eye;
4. describe red eye and how to interpret findings;
5. differentiate ciliary and conjunctival injection;
6. explain eyelid diseases, orbital diseases, orbital cellulitis, graves ophthalmopathy;
7. illustrate how to assess presence of proptosis by inspection; and
8. discuss how to assess the position of upper eyelid by measuring the distance between the lid margin and the corneal reflex.

Course Contents
Anatomy of lids, conjunctiva, cornea, lacrimal system. Tear production and drainage. Common causes of red eye. Symptoms associated with red eye. Steps to differentiate red eye and how to interpret findings. Eye lid diseases. Malpositions (ptosis, ectropion, entropion, retraction, lagophthalmos). Inflammations (chalazion, blepharitis). Infections (Hordeolum, orbital cellulitis). Nasolacrimal duct obstruction.

OPT 605: Lens and Cataract (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe lens anatomy;
2. discuss cataract, definition, epidemiology, etiopathogenesis, classification;
3. list symptoms attributable to cataract;
4. explain abnormal lens features by direct ophthalmoscopy;
5. describe physiology of accommodation and presbyopia;
6. discuss lens abnormality found in important systemic diseases like Marfan's syndrome; and
7. enumerate treatment of cataract, cataract extraction with artificial lens implantation.

Course Contents
Anatomy of lens, intraocular location of lens behind the iris, optical clarity of normal lens, suspension of normal lens in retroiridic position by zonules. Proptosis, definition, causes of proptosis in adults and children. Cataract, definition, classification, epidemiology, etiopathogenesis, management of cataract. Physiology of accommodation. Presbyopia.

OPT 607: Neuro-Ophthalmology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. test pupillary reactions with penlight and recognize relative afferent pupillary defect;
2. demonstrate confrontational visual field test in 4 quadrants for each eye;
3. describe visual field defect, scotoma, hemianopia;
4. perform ductions and versions test;
5. demonstrate knowledge of basic anatomy of anterior chamber angle;
6. describe aqueous humour production and circulation;
7. define glaucoma, its types, epidemiology, risk factors, treatment;
8. enumerate normal value range of intraocular pressure and diurnal variation, types of tonometry;
9. discuss relative afferent pupillary defect;
10. demonstrate anterior chamber depth estimation with pen torch;
11. describe visual field assessment by confrontation; and
12. recognise optic disc signs of glaucomatous optic neuropathy.

Course Contents
Basic anatomy of afferent visual pathway, ocular motor pathway, ocular autonomic pathway, pupillary pathway, optic nerve diseases papilledema, optic atrophy, papillitis, acute onset cranial nerves palsy, 3rd, 4th, 6th. Test pupillary reactions with penlight and recognise relative afferent pupillary defect. Confrontation visual field test. Visual field defects, scotoma, hemianopia, homonymous hemianopia, bitemporal hemianopia, optic disc examination with ophthalmoscope. Ductions and Versions test. Anatomy of anterior chamber angle, aqueous humour production and circulation, outflow pathways, trabecular meshwork in anterior chamber angle. Glaucoma, definition, types, epidemiology, risk factors, clinical features and management. Intraocular pressure, normal value range, types of tonometry. Direct ophthalmoscopy of signs of glaucomatous optic neuropathy. Visual field changes. Acute angle closure glaucoma.

OPT 609: Paediatric Ophthalmology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe basic anatomy of extra ocular muscles and normal ocular alignment;
2. explain amblyopia, pathophysiology and types of amblyopia;
3. list the abnormal ocular alignment such as exotropia, esotropia and the risk of amblyopia in children;
4. test visual acuity in children;
5. recognise and characterise ocular misalignment by Hirschberg test; and
6. enumerate causes of leukocoria, epidemiology, clinical features and management of retinoblastoma.

Course Contents
Normal anatomy of extraocular muscles and normal ocular alignment. Principles of abnormal ocular alignment (exotropia, esotropia) and the risk of amblyopia in children. Hirshberg test, principles of visual acuity testing in children, causes of leukocoria. Retinoblastoma, epidemiology, clinical features, management.

OPT 611: Ocular Manifestations of Systemic Diseases (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe anatomy and functions of the retina, macula;
2. list symptoms suggestive of vitreoretinal disorders;
3. recognise fundus features of normal fundus, important systemic diseases, important ocular diseases with direct ophthalmoscope;
4. recognise retinal arteriolar narrowing, copper/silver wiring on dilated fundoscopy;
5. detect disc oedema on dilated fundoscopy;
6. recognise retinal exudates and haemorrhages on dilated fundoscopy;
7. demonstrate confrontational visual fields test with recognition of hemianopias;
8. define amaurosis fugax and discuss visual changes;
9. explain the importance of recognising traumatic hyphaemia as a risk factor for acute visual loss in sickle cell anaemia;
10. discuss clinical, Werner, classification of thyroid orbitopathy and treatment;
11. describe adnexal, anterior segment, posterior segment features of HIV; and
12. explain ocular features of leprosy and onchocerciasis, WHO classification/staging of trachoma, SAFE Strategy in trachoma control.

Course Contents
Signs and symptoms of ocular conditions that are associated with important systemic diseases and diagnosis. Hypertension, diabetes, sickle cell disease, thyroid (graves) disease, myasthenia gravis, HIV (AIDS). Tropical ophthalmology (leprosy, trachoma, onchocerciasis). Dilated fundus examination to recognise retinal haemorrhages, exudates, retinal arteriolar narrowing (copper and silver wire), disc oedema.

OPT 613: Refractive Errors (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the human eye as an optical system and principles of refractive errors, myopia, hyperopia, astigmatism, presbyopia;

2. describe the spectacle corrections of refractive errors;
3. explain the need for low vision rehabilitation; and
4. define blindness and visual impairment.

Course Contents
Human eye as an optical system. Emmetropia. Principles of common refractive errors and corrections, myopia, hypermetropia, astigmatism, presbyopia. Physiology of accommodation. Low vision rehabilitation.

OPT 615: Community Ophthalmology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the concept of the global initiatives VISION 2020; and
2. list causes of blindness in adults and children.

Course Contents
Definition of blindness and visual impairment (WHO). Concept of global initiatives vision 2020. Causes of avoidable and irreversible blindness in adult and children.

ANE 601: Anaesthesia Lectures (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe basic anatomy of the airway and peripheral nervous system, common diseases and emergencies including trauma;
2. explain basic physiology of respiration, cardiovascular, nervous, including autonomic and neuromuscular systems;
3. discuss basic biochemistry of electrolytes, acid-base disorders, ionisation of drugs and nutrition;
4. enumerate principles of the use of premedicants;
5. explain physiological changes in pregnancy as they relate to anaesthesia;
6. describe regional anaesthesia and analgesia in obstetrics, subarachnoid block and epidural;
7. explain technique of general anaesthesia in patients with full-stomach, Pregnant woman;
8. enumerate in details various modalities of providing analgesia in labour;
9. define the role of the anaesthetist in resuscitation;
10. discuss perioperative management, pain management;
11. differentiate palliative care and intensive care;
12. explain detailed preanesthetic evaluation, preparation and premedication;
13. describe preanesthetic preparation, monitoring, induction using IV or inhalational agents;
14. discuss muscle relaxants, maintenance and termination of anaesthesia;
15. enumerate local anaesthetics, subarachnoid block, indications, contraindications, technique;
16. list complications and management, epidural analgesia/anaesthesia, indications, contraindications, technique, complications and management;
17. define intravenous regional anaesthesia;
18. list complications of anaesthesia and management;
19. describe post anaesthesia care unit, its complications and management;
20. explain perioperative blood loss and replacement;
21. provide basic life support, (BLS);
22. recognise the high-risk patient;

23. explain international standards of BLS, anaesthesia, pain, palliative and critical care; and
24. assess, manage acute and chronic pain conditions in all age groups.

Course Contents
Applied basic anatomy of the airway and peripheral nervous system, common diseases and emergencies including trauma. Applied basic physiology of respiration, cardiovascular, nervous (including autonomic) and neuromuscular systems. Applied basic biochemistry of electrolytes, acid-base disorders, ionisation of drugs and nutrition. Applied pharmacology of drugs used in anaesthesia. Applied principles of the use of premedicants (anxiolytics, opioids/antagonist, other analgesics, anticholinergics), anaesthetics (inhalational/ parenteral), muscle relaxants, anticholinesterases, local anaesthetics, adjuvant anaesthetics, ionotropes and antiarrhythmic drugs. Revision of physiological changes in pregnancy as they relate to anaesthesia. Regional anaesthesia and analgesia in obstetrics (subarachnoid block and epidural). Technique of General Anaesthesia in patients with full-stomach (pregnant woman). Detailed teaching of various modalities of providing analgesia in labour. Introduction to anaesthesia including history, types and role of the anaesthetist in resuscitation, perioperative management, pain management, palliative care and intensive care. Detailed preanesthetic evaluation, preparation and premedication. Detailed teaching of airway assessment, various causes of airway obstruction, consequences of airway obstruction and management. Non-invasive means of maintaining airway (head tilt, jaw thrust, chin lift). Use of airway devices (oropharyngeal, nasopharyngeal, laryngeal mask airway, endotracheal and emergency cricothyrotomy). Detailed teaching on hypoxia, its causes, consequences and management. Oxygen delivery devices. Introduction to artificial ventilation, its types, indications, modes, initiating and weaning off ventilator and complications of mechanical ventilation. Detailed preanesthetic preparation, monitoring, induction using IV or inhalational agents, muscle relaxants, maintenance and termination of anaesthesia. Principles and uses of Anaesthetic equipment, machine and breathing systems. Detailed teaching of the concept of Balanced anaesthesia. Anaesthesia outside theatre environment (ECT, angiography, endoscopy) and in difficult conditions. Anaesthesia in various disease conditions. Hypertension, DM, sickle cell disease, shock, renal failure. Day-case anaesthesia. Selection criteria. Technique, discharge criteria, complications and unplanned admission. Review of Local anaesthetics. Subarachnoid block, indications, contraindications, technique, complications and management. Epidural analgesia/anaesthesia, indications, contraindications, technique, complications and management. Common nerve blocks. Brachial plexus, indications, contraindications, techniques (interscalene, supraclavicular, infraclavicular, axillary), complications and management. Femoral, Three-in-one, ankle block; indications, contraindications, techniques, complications and management. Intravenous regional anaesthesia (Bier's block), indications, contraindications, technique and complications. Complications of anaesthesia and management. Post anaesthesia care unit, its complications and management. Perioperative fluid management. Perioperative blood loss and replacement. Indications and complications. Emergency anaesthesia, peculiarities and management. Basic blood gas analysis and interpretation. Theoretical teaching of BLS. Identification of cardiopulmonary arrest and demonstration of the skills of BLS. Introduction to ICU. Theoretical teaching of BLS. Identification of cardiopulmonary arrest and demonstration of the skills of BLS. Introduction to ICU. Introduction to Palliative care. Pain assessment methods. Causes of acute and chronic pain and the modalities of treatment.

ANE 603: Clinical Skills Simulation, ICU and Theatre Teaching (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:

1. apply the principles of anaesthesia in the perioperative management of patients;
2. demonstrate practical bedside skills required for the management of critically ill patient in the ICU; and
3. provide basic life support care under emergency conditions.

Course Contents
Clinical simulation, ICU and theatre evaluation in line with the principles of ANE 601.

PSY 601: General Psychiatry (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. illustrate some milestones in the historical development of psychiatry;
2. list various factors and hypotheses in the causation of mental illness;
3. describe biological foundation of human behaviour;
4. apply ICD and DSM in classifying mental disorders;
5. explain the application of principles of medical ethics in psychiatry;
6. differentiate the features of unipolar and bipolar disorders;
7. enumerate the risk of suicide in patients with mood disorders, risk assessment and management strategy;
8. define the term psychosis and list the clinical manifestations and presentation of patients with psychotic symptoms;
9. describe epidemiology, clinical course, prodromal stages, subtypes, and positive, negative and cognitive symptoms of schizophrenia;
10. explain management of patients with schizophrenia;
11. list differential diagnosis for patients presenting with anxiety including primary anxiety disorders and anxiety disorders secondary to other conditions;
12. discuss the epidemiology and distinguish the clinical course, co-morbidity, family history and prognosis of OCD and PTSD;
13. explain how to obtain a thorough substance use history through the use of empathic, non-judgemental interviewing techniques and established screening instruments;
14. list the clinical features of intoxication and withdrawal features in opiates, benzodiazepines, cannabis, alcohol, inhalants, cocaine, barbiturates, caffeine, nicotine, phencyclidine and amphetamines;
15. enumerate typical presentations of substance use disorders in general medical and psychiatric clinical settings;
16. discuss the concepts and relevance of personality traits and disorders in providing care;
17. list the three cluster conceptualization of personality disorders and describe typical features of each disorder;
18. discuss the common currently available psychotropic medications with regard to clinical indications, contraindications, presumed mechanism of action and relevant pharmacodynamics, common and adverse effects, pharmacokinetics; and
19. enumerate the factors relevant to implementing, monitoring and discontinuing psychotropic pharmacotherapy.

Course Contents
Introduction to psychiatry, history of psychiatry, definition of psychiatry, aetiological factors in psychiatric disorders, ethics in psychiatry. Classification of psychiatric disorders. Psychopathology (descriptive), phenomenological description of psychopathology including disorders of perception, thought and speech, emotion, experience of the self and consciousness. Neuroscience of psychiatric disorders, neural networks and neurotransmitters in psychiatric disorders, brain plasticity, genetics of psychiatric disorders, prefrontal cortex and

executive functioning, neurophysiology of integrated behaviour. Psychiatric assessment, history taking, mental state examination, physical examination in relation to psychiatry, psychological assessment including neuropsychological, cognitive, behavioural, personality. Interview in emergency, interview in general practice. Mood/affective disorders, depression, bipolar disorder, other mood disorders like premenstrual dysphoric disorder, dysthymia, cyclothymia, atypical depression, seasonal affective disorder. Schizophrenia spectrum disorders, schizophrenia, delusional disorders, psychotic disorders due to another medical conditions, catatonia associated with another mental or medical condition. Anxiety disorders, specific phobia, social phobia, generalized anxiety disorder, agoraphobia, panic disorder, selective mutism, separation anxiety disorder. Obsessive compulsive and related disorders, OCD, body dysmorphic disorder, hoarding disorder, trichotillomania, excoriation disorder, pandas. Trauma and stress related disorders, posttraumatic stress disorder (PTSD), acute stress disorder, adjustment disorder, persistent complex bereavement disorder, disinhibited social engagement disorder. Substance related and addictive disorder, including dependence (disorder), withdrawal and intoxication, alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotic or anxiolytics, stimulants, tobacco. Personality disorders, cluster a, b and c personality disorders, personality changes due to another medical condition. Clinical psychopharmacology, principle of rational prescribing, indication for the use of antipsychotics, anticonvulsant, drugs for dementia, cognitive enhancers, antidepressants, mood stabilizers, anxiolytics, stimulants, hypnotic treatments, drugs use in substance dependence, prescribing in pregnancy, adverse drug reactions.

PSY 603: Subspecialty Psychiatry (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. describe how to perform a psychiatric evaluation of children and adolescents;
2. assess and explain proposed differential diagnosis for children and adolescents presenting with disruptive behaviour;
3. illustrate psychiatric assessment in patients with physical illness;
4. enumerate how psychological factors affect other medical conditions;
5. discuss issues unique to psychiatric evaluation of the elderly (such as changing sensory perception);
6. compare and contrast the clinical presentation of psychiatric disorders in the elderly versus other adult;
7. list specific vulnerabilities and increase incidence of certain psychiatric disorders in the elderly;
8. list various behavioural changes encountered in the emergency;
9. explain non-adherence to medical treatment, overweight/obesity, malingering, child abuse and adult mal-treatment and neglect;
10. discuss Nigerian culture in relation to psychiatry, spiritual problems and psychiatry, culture-bound syndromes and stigma in psychiatry; and
11. describe issues of mental health in the community and of public health importance.

Course Contents

Child psychiatry, assessment methods in children and adolescence, elimination disorders, neurodevelopmental disorders, intellectual disability, communication disorders, autism spectrum disorder, ADHD, specific learning disorders, motor disorders, conduct and oppositional defiant disorders. Consultation-Liaison psychiatry, psychiatric assessment of physical illness, somatic symptoms and related disorders like somatic disorders, illness anxiety disorder, conversion disorder, psychological factors affecting other medical conditions, epilepsy, endocrine condition, cardiovascular and neurological conditions. Dissociative

disorders, organic mood and psychotic disorders. Feeding and eating disorders, sleep-wake disorders, sexual dysfunction. Geriatric and neurocognitive disorders, delirium, major and mild neurocognitive disorders due to alzheimer's disease, frontotemporal lobar degeneration, Lewy body diseases, vascular diseases, traumatic brain injury, substance/medication use, HIV infection. Forensic Psychiatry, introduction, capacity and consent. Emergency Psychiatry, acute behavioural disturbances, alcohol withdrawal, cannabis intoxication, medication-induced emergency, suicide and self-harm. Special treatments, psychotherapy, introduction to psychotherapy, cognitive behavioural therapy, problem-solving therapy, group therapy, physical therapy: electroconvulsive therapy, light therapy, transcranial magnetic stimulation, exercise and relaxation training in psychiatry. Special topics in psychiatry, non-adherence to medical treatment, overweight/obesity, malingering, child abuse and neglect, adult maltreatment and neglect, Nigerian culture, religion, spiritual problems and psychiatry, culture-bound syndrome, stigma in psychiatry, community mental health.

PSY 605: Tutorial and Seminar in Psychiatry (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical teaching for tutorials and seminar and emergency teaching based on the principle of courses outlined in PSY 601 to 603 above; and
2. lay emphasis on the must know desired competencies and common psychiatric disorders

Course Contents
Clinical teaching for tutorials and seminar and emergency teaching based on the principle of courses outlined in PSY 601 to 603 above. Emphasis on the must know desired competencies and common psychiatric disorders.

SUG 601: Plastic Surgery and Burns (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list symptoms and signs of common lesions in plastic and reconstructive surgery;
2. discuss principles of management of common lesions in plastic and reconstructive surgery;
3. investigate patients;
4. treat; and
5. manage complications.

Course Contents
Symptoms and signs of common lesions in plastic and reconstructive surgery, including their interpretations. Introduction to principles of management of common lesions in plastic and reconstructive surgery (ulcers, burns and skin grafts.) including relevant investigations, treatment, and treatment complications. Cleft lip and palate. Common cutaneous lesions and cosmetic surgery.

SUG 603: Cardiothoracic including Vascular Surgery (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate symptoms and signs of common lesions in cardiothoracic and vascular surgery;
2. discuss chest trauma and chest wall tumours;
3. explain principles of management of common lesions in cardiothoracic surgery;
4. investigate, treat and manage complications; and
5. list congenital malformations and their management.

Course Contents
Symptoms and signs of common lesions in cardiothoracic and vascular surgery, including their interpretations. Chest trauma and chest wall tumours. Introduction to principles of management of common lesions in cardiothoracic surgery including relevant investigations, treatment and complications. Congenital malformations and their management.

SUG 605: Neurosurgery (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss head injury and spinal trauma;
2. enumerate common surgical intracranial lesions and spinal cord lesions;
3. discuss congenital malformations and management; and
4. appraise the neurosurgical patient and intracranial haemorrhage.

Course Contents
Head injury and spinal trauma. Common surgical intracranial lesions as well as spinal cord lesions. Congenital malformations and their management. Evaluation of the neurosurgical patient and intracranial haemorrhage.

SUG 607: Special Topics in Surgery (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate general principles;
2. explain acutely injured, poly-traumatised patient;
3. discuss mass casualty; and
4. explain fractures and dislocations.

Course Contents
General principles. Acutely injured, poly-traumatised patient. Mass casualty. Fractures and dislocations.

SUG 609: Clinics, Theatre and Call Duty Bed Side Teaching (15 Units C: PH 675)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of SUG 605 to 611.

Course Contents
Clinical evaluation according to the principles of SUG 605 to 611.

MED 602: Metabolic and Endocrine Medicine (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display clinical skills in the evaluation of the metabolic and endocrine patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Diabetes mellitus. Risk factors. Pathogenesis. Clinical features and presentations. Complications. Investigations. Management. Hypothalamic. Pituitary. Adrenal-thyroid axis. Disorders of the hypothalamus. Disorders of the pituitary gland. Disorders of the thyroid gland. Disorders of calcium metabolism. Inborn errors of metabolism. Gout and wilson's disease.

MED 604: Neurology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the neurology patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. offer appropriate health education.

Course Contents
Higher cerebral function and dementia. Stroke. Sleep. Epilepsy. Parkinson's disease. Headache. spinal cord lesions. Peripheral neuropathy. Neuro-musculoskeletal diseases. Myasthenia gravis. Muscular dystrophy. The cranial nerves and autonomic neuropathy. Coma (causes, management). Meningitis (CSM, H. influenza, tuberculosis, pneumococcal). Viral infections of CNS. Cerebral abscess. Demyelinating disease. Cord compression. Brain tumours. Subacute combined degeneration.

MED 606: Cardiology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the cardiac patient;
3. investigate patients with utmost prioritisation;
4. demonstrate the knowledge and skills to manage and prevent the disease; and
5. identify risk factors, individual and community level for CVD.

Course Contents
Pathological functional sates of the heart: systolic and diastolic dysfunction; arrhythmias; ischaemic heart diseases. Cardiomyopathies. Dilated, restrictive and hypertrophic. Peripheral vascular diseases. Acute and chronic arterial diseases, embolic diseases, venous thromboembolism. CVS infections. Congenital abnormalities. Valvular abnormalities. Emergencies in cardiology.

MED 608: Gastroenterology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the gastroenterology patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Peptic ulcer disease. Cholecystitis and pancreatitis with consideration of diagnostic procedure such as laboratory tests. Cholecystogram. Endoscopic retrograde cholangiopancreatography (ERCP). Chronic active hepatitis, primary biliary cirrhosis, crohn's disease and ulcerative colitis. Gastrointestinal bleeding. Gastrointestinal malignancies. Malabsorption syndromes. Hepatic failure.

MED 610: Rheumatology and Care of the Elderly (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
The sero-negative arthritides. The sero-positive arthritides. Rheumatoid arthritis, sjogren's syndrome, ankylosing spondylitis, enteropathic arthropathy, osteoarthritis (degenerative joint disease). The connective tissue disorders. Systemic lupus erythematosus, systemic sclerosis (scleroderma), mixed connective tissue disease, dermatomyositis/polymyositis, giant cell arteritis, lessons on rehabilitation. Physiological and psychosocial changes in old age, medical and surgical diseases of the elderly. Psychiatric disorders of the elderly. Nutrition in the elderly. Competence and forensic issues in the elderly.

MED 612: Haematology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Anaemias. Nutritional. Haemolytic. Aplastic. Haemoglobinopathies. Bleeding disorders. Haematological manifestations of chronic diseases. Myelo-proliferative disorders/leukaemia's. Lymphomas. Myelomatosis.

MED 614: Infectious Diseases II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Host-pathogen interactions. Sepsis, systemic inflammatory response syndrome (SIRS), and multi-organ dysfunction syndrome. Viral infectious syndromes. Anaerobic infectious syndromes. Non-tuberculous mycobacterial infections. Diagnosis and treatment of Fungal infections. Infections complicating animal bites.

MED 616: Nephrology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Glomerulonephritis and nephrotic syndrome. Acute Kidney injury. Acute drug poisoning and overdose. Chronic kidney disease. Dialysis-acute and chronic. Urinary tract infection. Hypertension. Nephrolithiasis. Renal transplantation – indications. Post-surgical management, rejection and its management.

MED 618: Pulmonology II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate sound theoretical knowledge of the subject;
2. list and display sound clinical skills in the evaluation of the patient;
3. investigate patients with utmost prioritisation;
4. manage and prevent the disease as may be applicable; and
5. exhibit sound knowledge of individual and community level prevention of diseases.

Course Contents
Respiratory tract infections. Bacterial-pneumonias. Tuberculosis (pulmonary and extrapulmonary). Viral respiratory tract infections. Chronic obstructive lung diseases. Bronchial Asthma. Respiratory failure. Carcinoma of the lungs. Cryptogenic fibrosing alveolitis. The pneumoconiosis.

MED 620: Clinics, Call Duty and Bed Side Teaching (13 Units C: PH 585)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of MED 601 to 620;
2. demonstrate hands-on clinical evaluation of specific patients;
3. conduct history taking, examination, investigation and treatment; and
4. monitor hospitalised patients.

Course Contents
Clinical evaluation according to the principles of 601-609. Hands on clinical evaluation of specific patients, history, examination, investigation and treatment. Monitoring of hospitalised patients.

Minimum Academic Standards

Resource Requirements
Universities shall ensure the provision of adequate human, physical, equipment and library facilities in all the learning areas with strong information communication technology (ICT) infrastructure for the implementation of the minimum standards as indicated in this curriculum. The deployment of these resources, including simulation technology facilities and clinical skills laboratory teaching units are required of every university teaching courses that lead to degrees in medicine.

Equipment
The university shall provide adequate and appropriate equipment to meet the teaching and learning requirements in the different areas of the programme with adequate equipment maintenance back-up. In addition, each dental student at the 300 level shall have one complete phantom head unit with its accessories for operative techniques and dental motor with its hand piece and other accessories for prosthetic techniques. Each clinical department shall have one dental operatory for four clinical dental students doing their clerkship in that department.

Medical and dental equipment are highly sensitive to fluctuations in voltage of electrical power supply and to the presence of particles in water. There should be uninterrupted supply of electricity of steady voltage and provision of particle-free pipe-borne water with adequate pressure head. Therefore, a stand-by generator as well as an adequate overhead water-storage tanks are mandatory.

Basic Medical Sciences

S/N	Human Anatomy	Human Physiology	Medical Biochemistry
1.	Table with marble or stainless-steel tops with a minimum size of 6' x2, x3	Sherrington starling kymograph (electrically driven)	Analytical balance
2.	Tables with marble or stainless-steel tops - half standard size	Myograph stand	Urinometers calibrated
3.	Drill machine	Inductorium	Hot air oven
4.	Hand saw	Simple key	Digital colorimeters
5.	Band saw for sectioning body and limbs	Short circuiting key	Student microscopes
6.	Brain knife	Pohl's commutator	Glucometer with strips (for poct)
7.	Mortuary cooler with arrangement to keep body	Vibrating intemrpter	Thermometer 0 - 250 degree Celsius
8.	Storage tank to hold l0 cadavers, static/movable, durable tank with input and output.	Muscle trough	Semi autoanalvser
9.	Plastic tanks for storing soft and dissected parts	Muscle lever	Boiling water baths
10.	Multimedia projector with screen	Muscle grip of femur clamp	Constant temperature water bath tank capacity

			(temperature range 5 to 80'celsius)
11.	Trolley table	Hook and weight set	Laboratory reagent refrigerators
12.	Movie camera with projection screen	Heart lever (simple and starling)	Complete chromatographic unit for paper and TLC 2 each
13.	Computer with internet connection, and video cd library	Frog board for dissection	Centrifuge
14.	X-ray viewing lobby	Enamel trav	Ph meters of wide range digital
15.	X-ray plates/MRVCAT SCAR/USG	Frog board cork lined with boss head	Fixed volume pipettes -- lml, 0.5ml, 0.2ml, 0.lml and 0.02m1volume
16.	Charts, diagrams, models, slides.	Low voltage unit for tappin92 and 4 volts for stimulation	Complete electrophoresis apparatus with power supply (paper, page, agarose)
17.	Dissecting instruments for cadaveric dissection	Electromagnetic time marker	Densitometer with computer
18.	Meat cutting machine for thin body sections (trans and vertical)	Tuning fork time marker 100/sec	Bottle dispensers
19.	Cadavers	Electrodes	All glass distillation apparatus
20.	Embalming machine	X-blocks	Vortex mixers
21.		Spirit lamps	Incubator 37oc
22.	Histology laboratory	Marey's tambour	Variable and fixed volume micro auto pipettes
23.	Microscopes, monocular	Microscopes, oil immersion	Glass ware and accessories
24.	Dissection microscope	Demonstration eye piece	Fume cupboard
25.	Microtomes, rotary	Double demonstration eye piece	Digital analytical balance
26.	Microtomes, sledge, large cutting	Stage incubator	Balance micro
27.	Cabinet for slides (1000)	Westergren's pipette for E.S.R. On stand (with space pipette)	Spectrophotometer
28.	Incubators	Wintrobe's pipette for ESR and PCV with stand	Elisa (demonstration)
29.	Paraffin embedding bath	Perimeter pristely smith	Laptop
30.	Hot plates for flattening sections	Hemoglobin-meter sahli's or hellige (with spaces)	Desktop computer, with printer
31.	Hot air oven for drying slides	Hemocytometer	Photocopier and scanner

32.	Refrigerators	Sphygmomanometers	Multimedia projector with screen
33.	Marking pencils	Stethoscopes	
34.		Stethoscopes, demonstration with multiple earpieces	
35.	Museum	Polygraphs	
36.	Articulated skeleton set	Venous pressure apparatus	
37.	Bones (dis-articulated) sets	Spirometer, ordinary	
38.	Specimen wet	Gas analysis apparatus, halden's student type	
39.	Steel racks	Van slyke's apparatus manometric	
40.	Laptop	Gas analyser automatic for CO2, 02, N2	
41.	Desktop computer, with printer	Douglas bag, complete	
42.	Photocopier and scanner	Basal metabolism apparatus	
43.		Mosso 'ergograph	
44.		Clinical thermometer	
45.		Thermo-aesthesiometer	
46.		Algometer	
47.		Apparatus for passive movement	
48.		Knee hammer	
49.		Stethograph	
50.		Bicycle ergometer	
51.		Olfactometer	
52.		Ophthalmoscope	
53.		Schematic eye	
54.		Phakoscope	
55.		Perimeter with charts (lister's)	
56.		Colour perception lantern eldridge green	
57.		Maddox rod	
58.		Newtons colour wheel	
59.		Tuning fork to test hearing	
60.		Dynamometer	
61.		Otorhinolaryngoscope	
62.		Sterilizer electrical	
63.		Instrument trolley	
64.		Stopwatch	
65.		Multi-channel physiograph, 3 channels, complete with accessories	

66.		Student physiograph, (single channel) with accessories	
67.		Centrifuge, high speed with technometer	
68.		Colori meter, photoelectric	
69.		Ph meter electric	
70.		Refrigerator	
71.		Oxygen cylinder with trolley	
72.		T-t co2 cylinder with trolley	
73.		Electronic stimulator	
74.		Water distillation steel with spare heating elements	
75.		All glass distillation apparatus double stage	
76.		Voltage stabilizer	
77.		Thermometers, balances, microslides and glassware	
78.		Digital physiograph	
79.		Models and charts	
80.		ECG machine	
81.		Laptop	
82.		Desktop computer, with printer	
83.		Photocopier and scanner	
84.		Multimedia projector with screen	

	Pharmacology Laboratory
1.	Starlings' long extension kymographs
2.	The ideal respiration pump
3.	Brodi's operation tables
4.	Incubators
5.	Assembly perfusion apparatus for mammalian heart
6.	Assembly for mammalian classes
7.	Electric recording drums
8.	Mechanical stromhur
9.	Gadum's out-flow recorder
10.	Centrifuge
11.	Canulas (different types)
12.	Cautery machine, electric blendsone
13.	Varnishing tray with foot lever
14.	Four-unit isolated organ bath
15.	Analgesiometer
16.	Smoking burners

17.	Tracheal canula metal palmer
18.	Condons drop recorder
19.	Drop recorder
20.	Dissection instruments set
21.	Kymograph (students) electric independent unit
22.	X-blocks as required
23.	Hook grip rods as required
24.	Plain stand
25.	Apparatus for isolated rabbit intestine
26.	Jacquets graphic chronometer
27.	Frog board
28.	Jackson's enterograph
29.	Hair aesthesiometer
30.	Long extension for paper
31.	Animal balance tripple beam
32.	Manometer mercury
33.	Metronome palmer
34.	Oncometer kidney
35.	Oncometer heart
36.	Coppertrays
37.	Thermometer
38.	Distillation apparatus
39.	Microscopes with led
40.	Chemical balance-ordinary
41.	Chemical balance-sensitive
42.	Dissection instrument as required (set)
43.	Plethysmograph assorted
44.	Pneumograph palmer
45.	Piston recorder palmer
46.	Tambours mareys palmer
47.	Tetanus set palmer
48.	Stop watches jacquets
49.	Procelain dishes
50.	Crucibles with tongs
51.	Pestle and mortar
52.	Iron spatula
53.	Measure glass all sizes
54.	Water bath, metal
	Special Pharmacology Equipment
1.	Stimulator electronic Arthus Thomas
2.	Balance semi micro analytical
3.	Electrocardiograph
4.	Spectophotometer
5.	Skin and rectal thermometer
6.	Antihistamine chamber with manometer
7.	Flame photometer
8.	Stop clock
9.	Water bath 4 hole electrically heated
10.	Bell jars assorted
11.	Petri dishes assorted

12.	Museum drugs specimen jars	
13.	All glass distillation apparatus	
14.	Centrifuge electric	
15.	Microscope students type with mechanical	
16.	Stage and oil immersion	
17.	Magnetic stirrer	
18.	Autoclave electric	
19.	Hot air oven size	
20.	Incubator electric size	
21.	Vacuum and pressure pump	
22.	Instruments sterilliser electric size	
23.	B.p. Apparatus	
24.	Stethoscope	
25.	Multimeter	
26.	Temperature controlled water bath 37° C	
27.	Razor hone	
28.	Electric hot plate	
29.	Deionizer	
30.	Vortex mixer	
31.	Actaphotometer	
32.	Rotarod assembly	
33.	Eiectroconvulsiometer	
34.	Cook's pole climbing apparatus	
35.	Metabolic cagges (dieuretic study)	
36.	Digital PH meter	
37.	Tablet disintegration machine glass tubing	
38.	Mortar and pestles	
39.	Cork borer set	
40.	Holder for platinum wire loop	
41.	Lan et spring (disposable)	
42.	Magnifying glass with metal handle -	
43.	Suction pumps	
44.	Dessicators	
	Chemical Pathology	**Haematology/Immunology**
1.	Fume cupboard	Microscopes
2.	Autoclave electric	Demonstration eye piece.
3.	Constant temperature_ water bath	Stage incubator
4.	Incubator electric with thermostat	Centrifuge
5.	Hot air oven	Digital weighing machine (small)
6.	Magnetic stirrer	Westergren pipette with stand
7.	Pump vacuum	Shalis haemoglobinometer.
8.	Colorimeter	Haemocytometer
9.	Flame photometer	Needle destroyer
10.	Chromatographic chamber 01	RBC (hayern's) fluid
11.	Water distillation plant (metallic)	Wbc (turk's) fluid
12.	All glass distillation apparatus (dabble)	Lishman's stain
13.	Centrifuge clinical for 12 tubes	Anti ABO kit
14.	PH meter	Needle
15.	Ultraviolet (U.V.) Lamp	Cyring

16.	Electrophoresis apparatus with power supply	Cotton
17.	Spectrophotometer	Sprit
18.	Binocular research microscope	Slide box
19.	Compound microscopes	Sedimentation apparatus- one westergren's
20.	Ryle's tube	Blood bank with instruments
21.	Balance open pan	
22.	Balance semi micro	
23.	Vortex mixers	
24.	Urinometers	
25.	Thermometers	
26.	Stopwatch	
27.	Dessicator	
28.	Homogeniser	
29.	Samplers (auto pipettes) different volume range	
30.	Charts	
31.	Glassware and plasticware	
32.	Burettes (50 nil)	
33.	Glass pipettes	
34.	Pipette tips i box	
35.	Test tube (18 x 150 mm) i box	
36.	Glass pipettes (various volumes)	
37.	Conical flask (500 ml)	
38.	Volumetric conical flask (250 ml)	
39.	Graduated measuring cylinder PCV (1000 ml)	
40.	Graduated measuring cylinder gass (500 ml)	
41.	Graduated beakers: (500 ml) (250 ml) (100 ml) (50 ml)	
42.	Reagent bottle	
43.	Sample bottle (2000 ml)	
44.	Tripod stand	
45.	Wire gauze (iron base)	
46.	Test tube holder	
47.	Pipettes pump	
48.	Gas burners	
49.	Reagent rack	
50.	Semi-automated analyser	
51.	Ise analyser	
52.	Automated chemistry and immunology analyser	
53.	Poct analysers	
54.	Chemistry and immunology reagents	
55.	Elisa microplate reader and washer	

	Anatomic Pathology/Morbid Anatomy	**Microbiology**
1.	Coplin jars	Incubator
2.	Balance with weights	Autoclave 01
3.	Electric balance	Balance manual 01
4.	Monocular microscopes with oil immersion lens	Flask flat bottom 50cc as required
5.	Timers	Microscope 90
6.	Saw, wire for cutting bones	Test tube stands 06 -
7.	Slide boxes	Distilled water plant 01
8.	X-ray viewing box	Dropping bottle for stains (plastic) as required
9.	Double demonstration eye piece	Anaerobic apparatus (MCINTOSH) 02
10.	Overhead projector	Glassware (beakers, conical flask, reagent bottles and TETS tubes of various sizes)
11.	Urinometer	Graduated cylinders for various capacities (100 CC to 1000 CC) -
12.	Sternal puncture _needle adult_size-aspiration -	Thermometer (non- digital) 01
13.	Museum jars	Overhead projector 01 -
14.	Museum rack	Diamond pencil
15.	Cabinet for 5000 slides	Pipettes of various sizes
16.	Manual and automated tissue processor	Incubators
17.	Microtome	Hot air oven
	List of Models	Autoclave
1.	Ulcerative colitis	Distilled water plant
2.	Barrett's oesophagus	Dropping bottle for stains (plastic)
3.	Fibroadenoma	Anaerobic apparatus (MCINTOSH)
4.	Chronic osteomyelitis	B.O.D. Incubator
5.	Liver cirrhosis	Laminar air flow
6.	Fatty liver	V.D.R.L. Shaker
	List of Charts	Water bath
1.	Acute inflammation	Thermometer (non- digital)
2.	Chronic glomerulonephritis- early stage	Refrigerator (l80 Ltr)
3.	Apoptosis and necrosis	Centrifuge
4.	Causes of hypertension	Hot plate
5.	Atrophy	PH apparatus
6.	Degeneration -	Weighing balance digital
7.	Turnours of the pancreas: metastases	Microscopes
8.	Ulcerative colitis	Slide boxes
9.	Cirrhosis of liver	Book rack (wooden)
10.	Lymphocytic leukaemias	Test tubes stand of various size

11.	Pathologic changes in coronary artery disease	List of charts and models
12.	Pancoast tumour	Innate immunity and normal flora
13.	Acute and subacute myocardial infarcts	Infections in immune-compromised patients
14.	Aortic atresia and aortic valvular stenosis	Tuberculin testing
15.	Immunology- T cell	Non-sporing anaerobic infections
16.	Coarctation of aorta	Bacterial diarrhoea
17.	Atherosclerosis	Pneumonia
18.	The heart in hypertension: concentric hypertrophy	Typhoid fever
19.	The kidney in hypertension: benign and malignant	Cholera
20.	Immunology - B cell	DNA viruses- adenovirus, parvovirus and pox virus
21.	Congenital intracranial aneurysms	Herpes simplex virus
22.	Chronic inflammation	Rota virus
23.	Emphysema	Helical structure of virus
24.	Vasculitis - wegener's disease	HIV infection and aids
25.	Obesity and calories	Life cycle of an ascomycetes
26.	Thyroid pathology in hyperthyroidism with diffuse goitre (grave's disease)	Life cycle of the zygomycetes- rizopus
27.	Tetralogy of fallot	Yeast infections
	Histology	Filamentous fungi
1.	Water bath (57 degree Celsius)	Life cycle of dracunculus medinensis
2.	Tissue flotation	Gut helminths
3.	Slide boxes 200	Enterobius vermicularis
4.	Book rack (wooden)	Life cycle of trichinella spiralis
5.	Cell analyser	Life cycle of diphylobothrium latum
6.	Colorimeter (digital photo colorimeter instrument)	Life cycle o1tinia saginata
7.	Electric hot plate 01	Life cycle of H. nana
8.	Grossing kit 01	Life cycle of Oncocerca volvolus
9.	Glass tube rack 01	Rhabdo virus
10.	Incubator 02	Herpes simplex virus
11.	Microtome (leica 2125)	Influenza virus
12.	Micropipette	Polio virus
13.	Biomedical waste management containers (dustbins)	Cultivation of virus in egg
14.	Paraffin dispenser	Icosahedral structure of virus
15.	Centrifuge	Cytomegalovirus
16.	Refrigerator	Bacteriophage

17.	Binocular microscope	Adenovirus
18.	Binocular microscope	Hepatitis B virus

Community Medicine

	List of Charts, Models and Equipinent	**Chart Museum List**
1.	Comparator, Nessler	Ticks
2.	Barometer fortin	Life cycle of a Louse
3.	Filter, pasteur chamher1 complete set	Diarrhoea
4.	Filter	Prevention of disease
5.	Incubator, electric	Birth control methods
6.	Museum jars	Childbirth description
7.	Models charts and diagram	Disaster management
8.	Balance analytical	Tobacco bad effects
9.	Balance for weighing food stuff capacity 2 kg.	Poverty, a harsh reality
10.	Centrifuge clinical	Hazards of alcoholism
11.	Weighing machine	Growth chart
12.	Baby weighing machine	Hospital biomedica1 waste disposal
13.	Callipers for skinfold thickness	Smoking hazards
14.	Height measuring stand	Deficiency diseases
15.	Aquaguard	Daily allowance of nutrients
16.	Refrigerator	Keys to healthy 1iving
17.	Ice lined refrigerator (LL.R.)	Sanitary well
18.	Dissecting microscope	Protein animal nutrition
19.	Still for distilled water	Sewage treatment
20.	Autoclave	Rapid sand filter
21.	Sterilizers, electric	Bore hole
22.	Over head projector	Latrine
23.		Nutritional assessment
24.		Risks of obesity
25.		Dehydration
26.		Weight control
27.		Balanced diet
28.		Rat flea
29.		Waist circumference
30.		Itch mite
31.		Directly observed treatment short course
32.		Lifecycle of Black fly

33.		Vital statistics	
34.		Tuberculosis	
	Models	**Laminated Charts**	**Parasitology Charts**
1.	Water pollution	Malaria	Wucheria bancrofti
2.	Drainage system in the house	Chicken pox	Taenia saginata
3.	Sanitary well	Hepatitis A, B and C	Ascaris lumbricoides
4.	Colour coding hospital waste managements	Hookworm -	Taenia solium
5.	Nutrition pyramid	Pediculosis	Chronoscope
6.	Sedimentation tank	SARS	Horrocks apparatus
7.	Sewage treatment plant	Influenza	Entomology slides (box)
8.	Incubation period	Pinworm	
9.	RNTCP	Rabies	
10.	IMNC!	Scabies	
11.	Who growth chart	Syphilis	
12.	Icds	Tetanus	
13.	Weight for-age-score for boys and girls	Lyme disease	
14.	Natural history of disease	Botulism	
15.	Categorization of cases	Cholera	
16.		Ebola	
17.		Plague	
18.		Pneumonia	
19.		Salmonella (enteric fever)	

Staffing

Academic Staff/Student Ratio

The minimum ratio of academic staff to students in the basic medical sciences shall be 1:15 in each subject area while the minimum for clinical based medicine and surgery, and dentistry shall be 1:10 in each subject area. The mix of academic staff shall be in the ratio of 20%: 35%: 45% for professorial grade, senior lectureship and below. The following should also be pursued:

1. staff training programme should be pursued by all universities for the training of lecturers in teaching methods;
2. where shortage of manpower is obvious extensive use of self-instructional materials should be greatly encouraged; and
3. postgraduate programmes should be mounted in relevant clinical departments as may be required.

To start any programme in this discipline, there should be a minimum of six academic staff. There is need to have a reasonable number of staff with PhD degrees accounting for at least

70% of the total number in basic medical sciences having adequate teaching experience for every programme in the discipline. The entry point for lecturers in Pharmacology in the basic clinical sciences is PhD. For all other subjects in the basic clinical and clinical sciences the entry point for lecturers is the Fellowship of the National Postgraduate Medical College of Nigeria or its equivalent. Candidates must have additional PhD or earned MD to proceed from the senior lecturer level.

Administrative Support Staff
The services of the administrative support staff are indispensable in the proper administration of departments and faculty offices. It is important to recruit very competent, computer literate senior staff.

Technical Support Personnel
The services of technical support staff, which are indispensable in the proper running of laboratories and workshops, are required. It is important to recruit very competent senior technical staff to maintain teaching and research equipment. They are also to undergo regular training to keep them abreast of developments in equipment operation and maintenance.

Library
Universities should leverage on available technology to put in place rich databases and other electronic/digital library and information resources. In addition, well stock and current hardcopies of reference and other textual materials should be provided centrally. A good network of digital library should serve the entire university community. Availability of wireless facilities (wifi) with adequate bandwidth should enhance access to these electronic resources. In any case, there should be internet ready workstations available in the library for least 25% of the total student enrolled in each academic programme. The funding of the library should be in line with NUC guidelines. As the effectiveness of teaching is very much dependent on active research, facilities that encourage research are therefore, essential components of a medical school. There should be a well equipped medical library, with sufficient reading space and adequate supply of up-to-date journals, periodicals and reference textbooks in all fields of medicine. Audio-visual and e-learning facilities as resource for learning must also be provided. The library shall have modern information communication facilities for electronic access and retrieval of information. Inter library loan services should be encouraged.

Classrooms, Laboratories, Workshops and Office Spaces
The university shall provide adequate and appropriate physical spaces to meet the teaching requirements of the different areas of this curriculum.

Lecture/Seminar Rooms and Laboratories
These should be adequate in number and size. Sharing of facilities at hospital and university sites should be encouraged as preclinical lectures can be given in lecture rooms in hospital where these are available and vice versa. There should be a lecture theatre/auditorium large enough to accommodate all the students at a particular level within the college/faculty. Each department should have a seminar room for tutorials. There should be adequate laboratory spaces for all the departments in all universities.

Pre-Clinical
Separate departments of anatomy, physiology and medical biochemistry should be maintained. It should be emphasized that the laboratory environment for these should facilitate the demonstration and observation of procedures.

Clinical
There should be at least a multi-purpose teaching laboratory large enough to accommodate students on posting in the department of laboratory medicine. The physiology laboratory may also serve as pharmacology laboratory. The associated teaching hospital should have a clinical students' hostel. Also, there should be side laboratories for all students on clinical posting. The laboratory must meet the needs of the various cadres at various levels of training. A clinical skills laboratory is mandatory.

Research Laboratories
It is desirable to have research laboratories for postgraduate students and academic staff in the medical school. Each dental department shall have a complete dental operatory for research.

Staff Offices
Space for these staff offices should be provided for academic and non-academic staff. Sharing of rooms where necessary with provision of secretarial help should be encouraged. Academic and non-academic staff offices must meet the NUC guidelines which should also include equipment maintenance technicians' office. A common room should be provided for each of the following: academic staff, non-academic staff and students. The standard space requirement as shown below shall apply.

Position/rank	m2
Professor's office	18.50
Head of department's office	18.50
Tutorial teaching staff's office	13.50
Other teaching staff space	7.00
Technical staff space	7.00
Secretarial space	7.00
Seminar space/per student sitting	1.85

Hospital Facilities
The teaching hospitals should also have sufficient number and variety of clinical cases for medical instruction, and there should also be an adequate number of teaching and non-teaching staff and infrastructure.
Hospital facilities including wards/bed spaces, the minimum laboratory facilities and number of patients in each teaching hospital and medical school must meet the guidelines. Each medical school must have a well-developed simulation technology and clinical stalls laboratory.

Simulation Laboratory and Clinical Skills Acquisition Centre
All universities should have a clinical skill acquisition centre with mannikins and a simulation laboratory should be in place.

Student Accommodation
All universities should provide accommodation for medical students. Where possible all students should live in university hostels with not more than two students sharing a room for health reasons. Clinical students must live within hospital premises or at most 2km from the teaching hospital.

Bachelor of Dental Surgery (BDS/BChD)

Overview

The Bachelor of Dental Surgery (BDS/BChD) degree programme share common courses with the Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB) degree up until the 400 level. However, the basic dental science subjects including oral biology and dental anatomy would be taught at the 300 level, and the phantom head course consisting of science of dental materials, introduction to cariology, operative techniques and prosthetic techniques at the 400 level. The core clinical dentistry courses would be taught at the 500 and 600 levels. The curriculum is unique in several respects and is designed to enable the graduate to meet the needs of a rapidly changing practice environment.

Philosophy

The education of health professionals must be attuned to the health needs of the society. This commitment should be reflected in a competency-directed and community-oriented approach in the training of the health professional with emphasis on social responsiveness and relevance, as well as life-long learning.

Objectives

The Bachelor of Dental Surgery curriculum is designed for a six-year period, inclusive of the 100-level programme.

The broad objectives are to:

1. promote the production and development of dentists with sound knowledge in physiological, anatomical and biochemical processes in the human body that would lead to the discussing of various diseases;
2. produce dentists who are proficient in clinical clerkship and the use of modern technology for the diagnosis and management of patients;
3. produce dentists capable of discussing diseases and their manifestations using laboratory and pathological skills and knowledge, including the determination of the effect of diseases on the lives of individuals and persons in the community;
4. train dentists with sound knowledge and discussing of causes of diseases at the individual and community levels, and other public health challenges using evidence-based methods;
5. train dentists with an in-depth knowledge of therapeutics and with ability to determine drug actions in their patients;
6. produce dentists with knowledge of ethical principles of the medical profession to attend to diverse ethical situations in the multicultural setting of the Nigerian Nation and other cultures;
7. produce dentists as professionals who are polite, considerate, trustworthy, honest, act with integrity, maintain confidentially, respect patients' dignity and privacy;
8. inculcate into the dentists the spirit of teamwork and multi-disciplinary approach to medical practice;
9. produce dentists with sound theoretical knowledge and skills capable of undertaking research in various fields of dentistry and general health;
10. produce dentists as professionals who recognise the principles of patient-centered care, including self-care, and deal with patients' healthcare needs in consultation with them and, where appropriate, their relatives or carers; and
11. produce dentists with skills for life-long and self-directed learning.

Unique Features of the Programme

The unique features of the programme are:

1. the core curriculum includes the 100 level General Basic Science courses, the courses in the programme being horizontally and vertically integrated and taught in semesters;
2. for the Bachelor of Dental Surgery degree, the professional examinations are six, each taken at the end of relevant courses that are designated for particular professional examinations;
3. for horizontal integration, as much as possible, system-wide courses are taught concurrently across subjects. For instance, the anatomy of the thorax and abdomen (including histology) is taught at the same level and semester in the curriculum during which respiratory, gastro-intestinal and renal physiology is also taught;
4. for vertical integration, courses overlap into semesters and levels preceding those when their professional examinations are to be held. For instance, pathology and pharmacology which are assessed at the Second Professional Examination at the 400 level, have their teaching commencing at the 300 level when the First Professional Examination for the subjects of Human Anatomy, Human Physiology and Medical Biochemistry is held. In the same vein, teaching in Internal Medicine and Surgery commences at the 400 level when the subjects of Pathology and its branches as well as Pharmacology are examined at the Second Professional Examination. Furthermore, teaching in Community Medicine which is examined in the Fourth and Final Professional Examination at the 600 level, commences at the 200 level with Community Orientation and the subject is taught virtually at all levels up to the last. These actions ensure that the Basic Medical Science, Basic Clinical Science and the Clinical Science courses are integrated, overlap and flow into one another and are not in strict compartments;
5. the curriculum is competency-based and attuned to the needs of society by being strongly community oriented. Teaching is in line with identified learning objectives and the acquisition of practical skills which are in sync with the philosophy of the discipline;
6. prolonged didactic lectures are discouraged while self-learning, learning in small groups and seminars are encouraged. The importance placed on competency and the acquisition of practical skills with less didactic teaching frees up time for self-learning, free weekends, some leisure as well as resits of professional examinations;
7. the curriculum emphasises a satisfactory knowledge base, spirit of teamwork, social and ethical responsibility as well as life-long learning. Emphasis is also placed on digital literacy and the proficient use of modern digital equipment, including computers and other ICT facilities in patient care and data management;
8. acquisition of clinical skills is introduced early, at the 200 level and learning outcomes are clearly defined for each subject that is taught in all parts of the curriculum;
9. related issues in health care consisting of bio-medical ethics, medical jurisprudence, alternative medicine, health care management and administration, and entrepreneurship are taught and examined; and
10. the degree that the curriculum leads to, the Bachelor of Dental Surgery remain unclassified. However, the curriculum has been structured on the Course Credit/Grade Point Average System to enhance the subsequent issuance of academic transcripts, the award of prizes and in conformity with global best practices.

Employability Skills

1. Ability to work long hours in good spirit, often under pressure.
2. Good practical skills for clinical evaluation and emergency management.
3. Effective clinical decision-making.
4. Ability to provide leadership and management skills to a multidisciplinary healthcare team.
5. Good communication skills, compassion, and good bedside manners.
6. Drive to continue learning throughout career.
7. Capacity to apply information technology skills in clinical care settings.

21st Century Skills

1. Collaboration
2. Communication
3. Critical thinking
4. Information literacy
5. Innovation
6. Leadership
7. Life-long learning
8. Problem solving
9. Social skills
10. Technology literacy

Admission and Graduation Requirements

Admission Requirements

Six Year Programme

1. In addition to acceptable scores in the Unified Tertiary Matriculation Examination (UTME), candidates to be admitted into the degree programme shall possess a credit pass in each of the following: Physics, Chemistry, Biology, Mathematics and English language at the Senior Secondary Certificate (SSC) or their equivalents at one sitting.
2. In addition, they will sit for and obtain an acceptable score for the university they wish to be admitted into at the Joint Admission and Matriculation Examination as well as the post UTME.

Five Year Programme

1. Candidates who possess relevant 'A' level passes in Physics, Chemistry and Biology/Zoology.
2. Holders of first degrees in relevant science areas may also be admitted through the direct entry mode.
3. Candidates seeking direct entry into the programme should in addition have credit passes in Physics, Chemistry, Biology, Mathematics and English language at the SSC or their equivalents at one sitting.
4. In addition, they will register for and be admitted through the Joint Admission and Matriculation Board as well as the post UTME and screening of the respective University.

Duration

The Dentistry programme shall be for a minimum of six (6) years consisting of one year of basic sciences, two years of basic medical sciences, one year of basic clinical sciences and two years of clinical sciences. Other than the one year of basic sciences, the periods for the basic medical, basic clinical and clinical sciences courses are not in strict compartments as they overlap slightly during the course of the programme.

Graduation Requirements

1. To graduate from the BDS/BChD degree programme**,** a student shall have undergone six (6) or five (5) academic sessions depending on the admission entry mode, Six Year Programme or Five Year Programme.
2. The student must have passed all prescribed professional examinations (from 200 level) with a score of not less than 50% in each course. For the clinical courses, a pass (minimum of 50% score) in the clinical component of each examination is also required. To graduate, a student must be found worthy in character throughout the period of his/her course of study. The student must also submit the report of a supervised research project.

3. The BDS/BChD degree shall remain unclassified according to the CGPA but excellence may be recognised through the award of distinctions.

Global Course Structure

The courses leading to the award of BDS/BChD degree are the basic medical sciences, the basic clinical sciences and the clinical medical/dental sciences. The programme should produce compassionate, socially responsive, relevant and accountable graduates that meet up with global standards of the attitude, skills and knowledge of the profession required for general clinical practice and further specialist professional and or academic training. the subjects under the various courses are allotted definite time and common courses could be taken along with other students within the college. The programme shares common attributes and subjects with the bachelor of medicine programme particularly in the first four years. The students are exposed to clinical medicine as early as possible in the programme, integrated with the basic medical sciences. they would be exposed to some aspects of clinical medicine which should include internal medicine, surgery, the methods of instruction and assessment should be integrated, competency-based, community-oriented and person/patient-centered. All courses in this programme are compulsory.

The basic medical science subjects are human anatomy, human physiology and medical biochemistry (level 200 and 300) including oral biology and dental anatomy which are taught at the 300 level. The basic clinical sciences subjects are pathology (microbiology, chemical pathology, morbid anatomy, Haematology) and pharmacology (level 300 and 400) including the phantom head course consisting of science of dental materials, introduction to cariology, operative techniques and prosthetic techniques which are taught at the 400 level. The clinical sciences subjects are those related to dentistry but will include introduction to medicine with all its specialties and introduction to surgery with all its specialties. The clinical dental subjects would include clinical conservative dentistry, oral and maxillofacial surgery, oral pathology, oral medicine, oral radiology, clinical prosthodontics, paediatric dentistry, orthodontics, endodontics, dental public health/community dentistry and biostatistics and periodontology (level 500 and 600). Gerodontology, practice management and ethics and jurisprudence would also be taught at 600 level.

BDS/BChD programme map with credit weights

	Basic Medical Sciences					
S/N	Course Title	1st Sem 200L	2nd Sem 200L	1st Sem 300L	Total	
1a	Human Anatomy Lectures	8	8	8	24	
1b	Gross Dissection	5	5	5	15	
1c	Histology	3	3	2	8	
1d	Embrology	2	3	2	7	
2a	Human Physiology Lectures	9	10	13	32	
2b	Physiology Practicals	2	2	3	7	
3a	Medical Biochemistry Lectures	8	8	8	24	
3b	Medical Biochemistry Practicals	2	2	2	6	
	SubTotal	39	41	43	123	
4	Oral Biology	-	-	3	3	
5	Dental Anatomy	-	-	8	8	
	Total For Semesters	**39**	**41**	**54**	**134**	
	Basic Clinical Sciences					
	Pathology	I 2nd Sem 300L	II 1st Sem 400L	III 2nd Sem 400L	Total	
1	Morbid Anatomy	9	9	-	18	
2	Microbiology	8	9	-	17	
3	Chemical Pathology	6	10	-	16	
4	Haematology/Immunology	4	8	-	12	
5	Pharmacology	9	8	-	17	
6	Pre-phase courses	-	-	15	15	
	Total	**36**	**44**	**15**	**95**	

	Clinical Sciences			
S/N	Course Title	I 1st Sem 500L	II 2nd Sem 500L	Total
1.	Medicine (1st sem 400L)	10	-	10
2.	Surgery (1st sem 400L)	10	-	10
3.	GDS I	3	3	6
4.	Oral and Max Pathol	9	-	9
5.	Oral Medicine	9	-	9

6.	Orthodontics	15	-	15
7.	Conservative Dent	-	18	18
8.	Prosthetic Dent		13	13
9.	Oral/Max Surg	-	17	17
10.	Pediatric Dent	-	12	12
11.	Dent Public Healh	3	13	16
12.	GDS II		-	6
13.	Periodontics		12	12
14.	Total for Clinical Sciences	59	88	**147**
	Grand total Units for the Programme			**376**

100 Level

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 111	Communication in English	2	C	15	45
GST 112	Nigerian Peoples and Culture	2	C	30	-
MTH 101	Elementary Mathematics I	2	C	30	-
MTH 102	Elementary Mathematics II	2	C	30	-
BIO 101	General Biology I	2	C	30	-
BIO 102	General Biology II	2	C	30	-
BIO 107	General Biology Practical I	1	C	-	45
BIO 108	General Biology Practical II	1	C	-	45
CHM 101	General Chemistry I	2	C	30	-
CHM 102	General Chemistry II	2	C	30	-
CHM 107	General Practical Chemistry I	1	C	-	45
CHM 108	General Practical Chemistry II	1	C	-	45
PHY 101	General Physics I	2	C	30	-
PHY 102	General Physics II	2	C	30	-
PHY 107	General Physics Practical I	1	C	-	45
PHY 108	General Physics Practical II	1	C	-	45
	Total	**26**			

Courses leading to First Professional BDS/BChD Examination

200 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
ENT 211	Entrepreneurship and Innovation	2	C	15	45

ANA 201	Intro. H Anatomy and Gross Anatomy of Upper and Lower Limbs	3	C	45	-
ANA 203	Histology of Basic Tissues	1	C	15	-
ANA 205	General Embryology	2	C	30	-
ANA 207	Practical Work	4	C	-	180
PHS 201	Introductory Physiology and the Autonomic Nervous System	2	C	30	-
PHS 203	Blood physiology	2	C	30	-
PHS 205	The Cardiovascular system	2	C	30	-
BCH 201	Cell Biology, PH and Buffer	1	C	15	-
BCH 203	Carbohydrate Chemistry	2	C	30	-
BCH 205	Amino Acids Chemistry	1	C	15	-
BCH 207	Biochemistry Practical l	2	C	-	90
BCH 209	Lipid Metabolism	1	C	15	-
CSS 201	Clinical Skills I	2	C	-	90
	Total	**27**			

Courses leading to Second Professional BDS/BChD Examination

200 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 212	Philosophy, Logic and Human Existence	2	C	30	-
ANA 202a	Gross Anatomy of Thorax and Abdomen	2	C	30	-
ANA 202b	Gross Anatomy of Pelvis and Perineum	2	C	30	-
ANA 204	Systemic Histology (Organology)	3	C	45	-
ANA 206	Systemic Embryology (Organogenesis)	1	C	15	-
ANA 208	Practical Work	2	C	-	90
PHS 202	Renal Physiology, Body Fluids and Temperature Regulation	3	C	45	-
PHS 204	Respiratory system	2	C	30	-
PHS 206	Neuroscience I	2	C	30	-
BCH 202	Nucleic Acids Chemistry	2	C	30	-
BCH 204	Enzymes, Coenzymes and Bioenergetics	1	C	15	-
BCH 206	Amino Acids Metabolism	1	C	15	-
BCH 208	Carbohydrate Metabolism	2	C	30	-
BCH 210	Biochemistry Practical II	1	C	-	45
MDH 202	Multidisciplinary Healthcare	2	C		90
CSS 202	Clinical Skills II	2	C	-	90
	Total	**30**			

Courses leading to Third Professional BDS/BChD Examination

300 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
ANA 301	Gross Anatomy of Head and Neck and Neuroanatomy	4	C	60	-
ANA 303	Histology of Special Senses and Neuro-histology/Histo-chemistry	2	C	30	-
ANA 305	Neuro-embryology and Development of Pharyngeal Apparatus	1	C	15	-
ANA 307	Human Genetics	2	C	30	-
ANA 309	Laboratory Techniques for Light Microscopy/Gross Radiologic Techniques	3	C	15	90
ANA 311	Practical Work	3	C		135
PHS 301	Gastrointestinal Physiology	2	C	30	-
PHS 303	Endocrinology and Reproduction	2	C	30	-
PHS 305	Pathophysiology I	2	C	30	-
PHS 307	Laboratory Teaching and Instrumentation	2	C	30	-
PHS 309	Neuroendocrinology	2	C	30	-
PHS 311	Pathophysiology II	2	C	-	90
BCH 301	Metabolism of nucleic acid and protein synthesis	2	C	30	-
BCH 303	Integration of Metabolism	1	C	15	-
BCH 305	Nutrition	2	C	15	45
BCH 307	Biochemical Genetics and Molecular Biology	2	C	30	-
BCH 309	Special Topics	2	C	30	-
ORB 301	Oral Biology	3	C	15	90
DAT 301	Dental Anatomy	4	C	30	45
DAT 303	Dental Anatomy Practicals	4	C	-	180
	Total	**44**			

300 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
GST 312	Peace and Conflict Resolution	2	C	30	-
ENT 312	Venture Creation	2	C	15	45
PAT 302	General Pathology I	4	C	60	-
PAT 304	General Pathology II	4	C	60	-
PAT 306	Pathology Practical I	1	C		45
PCL 302	Introductory Pharmacology	3	C	45	-
PCL 304	Autonomic Pharmacology	3	C	45	-
PCL 306	Cardiovascular Pharmacology	3	C	30	45

MIC 302	Introductory Microbiology and General Bacteriology	2	C	15	45
MIC 304	General Parasitology	2	C	30	-
MIC 306	General Virology	2	C	30	-
MIC 308	General Mycology	2	C	15	45
CPY 302	Introduction to Chemical Pathology	3	C	30	45
CPY 304	Immunology	1	C	15	-
CPY 306	Clinical Chemistry of Disease I	2	C	15	45
HEM 302	General Haematology I: Introductory Haematology	4	C	30	90
	Total	**40**			

400 Level First Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
PAT 401	Systemic Pathology I	3	C	45	-
PAT 403	Pathology Practical II	2	C		90
PCL 401	GIT Pharmacology	1	C	15	-
PCL 403	Respiratory Pharmacology	1	C	15	-
PCL 405	Clinical Pharmacology and Therapeutics	2	C	30	-
MIC 401	Medical Bacteriology	1	C	15	-
MIC 403	Medical Mycology	1	C	15	-
MIC 405	Medical Parasitology	1	C	15	-
MIC 407	Applied Medical Microbiology	1	C	15	-
CPY 401	Clinical Chemistry of Disease II	3	C	30	45
CPY 403	Analytical Procedures and Practicals	2	C	-	90
HEM 401	General Haematology II: Anaemias	2	C	15	45
HEM 403	Haemato-Oncology and Bleeding Disorders	2	C	30	-
	Total	**22**			

Medicine Courses leading to in-course but not Professional Examinations

400 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
MED 401	Introduction to Clinical Medicine I	2	C	30	-
MED 405	Cardiology I	2	C	30	-
MED 407	Nephrology I	2	C	30	-

MED 409	Clinics, Call Duty and Bed Side Teaching I	13	C	-	585
	Total	**19**			

Surgery Courses leading to in-course but not Professional Examination

400 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
SUG 401	General Surgery I	5	C	75	-
SUG 403	Paediatric Surgery	2	C	30	-
SUG 405	Clinics, Theatre and Call Duty Bed Side Teaching I	13	C	-	585
	Total	**20**			

Courses leading to Fourth Professional BDS/BChD Examination

400 Level First Semester

Course Code	Course Title	Units	Status	LH	PH
SDM 401	Science of Dental Materials	2	C	30	-
SDM 403	Science of Dental Materials Practicals	3	C	-	135
CON 401	Cariology	2	C	30	-
CON 403	Operative Techniques	2	C	30	-
CON 405	Operative Technique practicals	2	C	-	90
PRO 401	Prosthetic Techniques	2	C	30	-
PRO 403	Prosthetic Techniques practicals	2	C	-	90
	Total	**15**			

400 Level Second Semester

Course Code	Course Title	Unit(s)	Status	LH	PH
PAT 402	Systemic Pathology II	3	C	30	45
PAT 404	Forensic Pathology	1	C	15	-
PCL 402	Clinical Toxicology	1	C	15	-
PCL 404	Central Nervous System Pharmacology	1	C	15	-
PCL 406	Endocrine Pharmacology	1	C	15	-
PCL 408	Chemotherapy	1	C	15	-
MIC 402	Medical Virology	1	C	15	-
MIC 404	Medical Entomology	1	C	15	-

MIC 406	Medical Protozoology	1	C	15	-
MIC 408	Medical Helminthology	1	C	15	-
MIC 410	Microbial Genetics	1	C	15	-
CPY 402	Clinical Nutrition and Nutritional Support	3	C	30	45
CPY 404	Clinical Enzymology	2	C	30	-
HEM 402	Blood Transfusion and Transplantation	2	C	15	45
HEM 404	Practical and Interpretative Haematology	2	C	-	90
	Total	**22**			

Courses leading to Fifth Professional BDS/BChD Examination

500 Level

Course Code	Course Title	Units	Status	LH	PH
GDS 501	Local Anaesthesia in Dentistry	3	C	30	45
GDS 503	Introduction to Clerkship in Dentistry	3	C	15	90
ORP 501	Introductory Oral and Maxillofacial Pathology and Pathological aspects of Oral Disease	3	C	30	45
ORP 503	Syndromes and Diseases of Specific Systems, Forensic Oral Pathology, Practical and Surgical Oral Pathology	3	C	30	45
ORP 502	Infections of the Oral Cavity	3	C	30	45
ORM 501	Introduction to Oral Medicine and Pharmacotherapy in Oral Medicine Practice	3	C	15	90
ORM 503	Dental Management Considerations in Patients with Systemic Disorders and Clinical Oral Medicine	3	C	15	90
ORM 502	Oral Diseases and Orofacial Pain and Temporomandibular Disorders	3	C	15	90
ORY 502	Foundations of Radiology	3	C	15	90
ORY 504	Intraoral and Extra-oral and Specialised Radiographic Techniques	3	C	15	90
ORY 506	Radiographic Interpretations and Practical Oral Radiology	3	C	15	90
PED 501	Introduction to Paediatric Dentistry Behavioural Management	3	C	15	90

PED 503	Clinical and Practical Paediatric Dentistry	3	C	15	90
PED 502	PulP Therapy and Prevention in Paediatric Dentistry. Trauma in Paediatric Dentistry	3	C	15	90
PED 504	Management of Children with Special Needs	3	C	15	90
PED 506	Hard Tissue Disorders and Craniofacial Anomalies	3	C	15	90
ORT 501	Introductory Orthodontics	3	C	15	90
ORT 503	Applied Orthodontics	3	C	15	90
ORT 502	Investigations, Diagnosis and Treatment Planning in Orthodontics	3	C	15	90
ORT 504	Orthodontic Treatment Options	3	C	15	90
ORT 506	Clinical and Practical Orthodontics	3	C	-	135
	Total	**63**			

Courses leading to Sixth Professional BDS/BChD Examination

Courses at 600 Level

Course Code	Course Title	Units	Status	LH	PH
CON 601	Theoretical Basis of Endodontics	2	C	30	-
CON 603	Endodontics	3	C	15	90
CON 605	Theoretical Basis of Advanced Conservation	3	C	45	-
CON 607	Advanced Conservation	3	C	15	90
CON 602	Clinical Conservative Dentistry	3	C	15	90
CON 604	Conservative Practicals	4	C	-	180
PRO 601	Complete Dentures	3	C	15	90
PRO 603	Partial Dentures	3	C	30	45
PRO 605	Specialised Prostheses and Implants	3	C	30	45
PRO 602	Clinical prosthodontics	2	C	-	90
PRO 604	Prosthodontics Practicals	2	C	-	90
GDS 601	Practice Management	2	C	15	45
GDS 602	Gerodontology	2	C	15	45
GDS 603	Ethics and Jurisprudence	2	C	30	-
OMS 601	Introduction to Oral and Maxillofacial Surgery and Exodontia in Mature Permanent Teeth	3	C	45	-
OMS 603	Maxillofacial Traumatology	2	C	30	-
OMS 605	Infections of the Mouth and Jaws	2	C	30	-
OMS 607	Oral Oncology	2	C	30	-

OMS 609	Surgical Management of Congenital and Cranio-Facial Pathologies	2	C	30	-
OMS 611	Diagnosis and Management of TMJ and Neurological Disorders	2	C	30	-
OMS 602	Oral and Maxillofacial Surgery Practicals, Clinicals and Theatre	4	C	-	180
PDL 602	Introductory Periodontology	3	C	15	90
PDL 604	Periodontal Pathophysiology	3	C	15	90
PDL 606	Management of the Periodontal Patient	3	C	15	90
PDL 608	Operative/Clinical Periodontology	3	C	-	135
DPH 601	Introduction to Dental Public Health, Epidemiology and Biostatistics	3	C	30	45
DPH 602	Prevention in Dentistry	3	C	45	-
DPH 604	Health Promotion and Education in Dentistry	3	C	45	-
DPH 606	Oral Health Policy and Management	3	C	45	-
DPH 608	Research Project	4	C	60	-
DPH 610	Clinical Primary Care Provision and Practical Oral Health Promotion	3	C	-	135
	Total	**85**			

Course Contents and Learning Outcomes

100 Level

GST 111: Communication in English (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. identify possible sound patterns in English language;
2. list notable language skills;
3. classify word formation processes;
4. construct simple and fairly complex sentences in English;
5. apply logical and critical reasoning skills for meaningful presentations;
6. demonstrate an appreciable level of the art of public speaking and listening; and
7. write simple and technical reports.

Course Contents
Sound patterns in English language (phonetics and phonology, vowels and consonants). English word classes (lexical and grammatical words, definitions, forms, functions, usages, collocations). Sentence in English (types: structural and functional, simple and complex). Grammar and usage (tense, mood, modality, concord and aspects of language use in everyday

life). Logical and critical thinking and reasoning methods (Logic and syllogism, inductive and deductive argument and reasoning methods, analogy, generalisation and explanations). Ethical considerations, copyright rules and infringements. Writing activities: (Pre-writing, writing, post writing/editing and proofreading; paragraphing, types of writing, summary, essays, letters, curriculum vitae, report writing, note making. and mechanics of writing). Comprehension strategies (reading and types of reading, comprehension skills, 3RsQ). Information and communication technology in modern language learning. Language skills for effective communication. Major word formation processes. Writing and reading comprehension strategies. Logical and critical reasoning for meaningful presentations. Art of public speaking and listening.

GST 112: Nigerian Peoples and Culture (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. analyse the historical foundation of the Nigerian culture and arts in pre-colonial times;
2. list and identify the major linguistic groups in Nigeria;
3. explain the gradual evolution of Nigeria as a political unit;
4. analyse the concepts of trade, economic and self-reliance status of the Nigerian people towards national development;
5. enumerate the challenges of the Nigerian State towards nation building;
6. analyse the role of the judiciary in upholding people's fundamental rights;
7. identify acceptable norms and values of the major ethnic groups in Nigeria; and
8. list and suggest possible solutions to identifiable Nigerian environmental, moral and value problems.

Course Contents

Nigerian history, culture, and art up to 1800 (Yoruba, Hausa and Igbo peoples and culture; peoples and culture of the ethnic minority groups). Nigeria under colonial rule (advent of colonial rule in Nigeria, Colonial administration of Nigeria). Evolution of Nigeria as a political unit (amalgamation of Nigeria in 1914, formation of political parties in Nigeria, nationalist movement and struggle for independence). Nigeria and challenges of nation building (military intervention in Nigerian politics and Nigerian Civil War). Concept of trade and economics of self-reliance (indigenous trade and market system, indigenous apprenticeship system among Nigeria people, trade, skill acquisition and self-reliance). Social justices and national development (law, definition and classification). Judiciary and fundamental rights. Individual norms and values (basic Nigeria norms and values, patterns of citizenship acquisition, citizenship and civic responsibilities, indigenous languages, usage and development, negative attitudes and conducts. Cultism, kidnapping and other related social vices). Re-orientation, moral and national values (The 3R's, reconstruction, rehabilitation and re-orientation). Re-orientation strategies, Operation Feed the Nation (OFN), Green Revolution, Austerity Measures, War Against Indiscipline (WAI), War Against Indiscipline and Corruption (WAIC), Mass Mobilization for Self-Reliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

MTH 101: Elementary Mathematic I (Algebra and Trigonometry) (2 Units C: LH 30)

Learning Outcomes

At the end of the course, students should be able to:

1. explain basic definition of set, subsets, union, intersection, complements and use of Venn diagrams;

2. solve quadratic equations;
3. solve trigonometric functions;
4. identify various types of numbers; and
5. solve some problems using binomial theorem.

Course Contents
Elementary set theory, subsets, union, intersection, complements, Venn diagrams. Real numbers, integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers, algebra of complex numbers, the Argand diagram. De-Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formulae.

MTH 102: Elementary Mathematics II (Calculus) (2 Units C: LH 30)

Learning Outcomes
At the end of the course, students should be able to:
1. identify types of rules in differentiation and integration;
2. describe the meaning of function of a real variable, graphs, limits and continuity; and
3. solve some applications of definite integrals in areas and volumes.

Course Contents
Function of a real variable, graphs, limits and idea of continuity. The derivative, as limit of rate of change. Techniques of differentiation. Extreme curve sketching, integration as an inverse of differentiation. Methods of integration and definite integrals. Application to areas and volumes.

BIO 101: General Biology I (2 Units C: LH 30)

Learning Outcomes
At the end of lectures in Plant Biology, students should be able to:
1. explain cells structure and organisations;
2. summarise functions of cellular organelles;
3. characterise living organisms and state their general reproduction;
4. describe the interrelationship that exists between organisms;
5. discuss the concept of heredity and evolution; and
6. enumerate habitat types and their characteristics.

Course Contents
Cell structure and organisation. Functions of cellular organelles. Characteristics and classification of living things. Chromosomes, genes their relationships and importance. General reproduction. Interrelationships of organisms (competitions, parasitism, predation, symbiosis, commensalisms, mutualism, saprophytism). Heredity and evolution (introduction to Darwinism and Lamarkism, Mendelian laws, explanation of key genetic terms). Elements of ecology and types of habitat.

BIO 102: General Biology II (2 Units C: LH 30)

Learning Outcomes
At the end of the lectures, students should be able to:
1. list the characteristics, methods of identification and classification of viruses, bacteria and fungi;
2. state the unique characteristics of plant and animal kingdoms;

3. describe ecological adaptations in the plant and animal kingdoms;
4. explain nutrition, respiration, excretion and reproduction in plants and animals; and
5. describe growth and development in plants and animals.

Course Contents
Basic characteristics, identification and classification of viruses, bacteria and fungi.
A generalised survey of the plant and animal kingdoms based mainly on the study of similarities and differences in the external features. Ecological adaptations. Briefs on physiology to include nutrition, respiration, circulatory systems, excretion, reproduction, growth and development.

BIO 107: General Biology Practical I (1 Unit C: PH 45)

Learning Outcomes
At the end of the course, students should be able to:
1. outline common laboratory hazards;
2. provide precautions on laboratory hazards;
3. state the functions of the different parts of microscope;
4. use the microscope and describe its maintenance;
5. draw biological diagrams and illustrations; and
6. apply scaling and proportion to biological diagrams.

Course Contents
Common laboratory hazards. Prevention and first aid. Measurements in biology. Uses and care of microscope. Compound and dissecting microscope. Biological drawings and illustration, scaling, accuracy and proportion. use of common laboratory apparatus and laboratory experiments designed to illustrate the topics covered in BIO 101.

BIO 108: General Biology Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of the course, students should be able to:
1. describe the anatomy of flowering plants;
2. differentiate types of fruit and seeds;
3. state ways of handling and caring for biological wares;
4. describe the basic histology of animal tissues; and
5. identify various groups in the animal kingdom.

Course Contents
Anatomy of flowering plants, primary vegetative body, stem, leaf and root to show the mature tissues namely parenchyma, collenchyma, sclerenchyma, xylem and phloem. Types of fruits and seeds. Care and use of dissecting kits and other biological wares. Dissection and general histology of animal tissues based on vertebrate forms. Morphology and functions of epithelial, muscular, nervous and connective tissues. Examination of various groups of lower invertebrates under microscopes, identification of various groups of organisms in animal kingdom. And any experiment designed to emphasise the practical aspects of topics in BIO 102.

CHM 101: General Chemistry I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define atom, molecules and chemical reactions;
2. discuss the modern electronic theory of atoms;
3. write electronic configurations of elements on the periodic table;
4. justify the trends of atomic radii, ionisation energies, electronegativity of the elements based on their position in the periodic table;
5. identify and balance oxidation – reduction equation and solve redox titration problems;
6. illustrate shapes of simple molecules and hybridized orbitals;
7. identify the characteristics of acids, bases and salts and solve problems based on their quantitative relationship;
8. apply the principles of equilibrium to aqueous systems using LeChatelier's principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures;
9. analyse and perform calculations with the thermodynamic functions, enthalpy, entropy and free energy; and
10. determine rates of reactions and its dependence on concentration, time and temperature.

Course Contents
Atoms, molecules, elements, compounds and chemical reactions. Modern electronic theory of atoms. Electronic configuration, periodicity and building up of the periodic table. Hybridisation and shapes of simple molecules. Valence forces and structure of solids. Chemical equations and stoichiometry, chemical bonding and intermolecular forces and kinetic theory of matter. Elementary thermochemistry, rates of reaction, equilibrium and thermodynamics. Acids, bases and salts. Properties of gases. Redox reactions and introduction to electrochemistry. Radioactivity.

CHM 102: General Chemistry II (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. state the importance and development of organic chemistry;
2. define fullerenes and its applications;
3. discuss electronic theory;
4. determine the qualitative and quantitative of structures in organic chemistry;
5. describe rules guiding nomenclature and functional group classes of organic chemistry;
6. determine rate of reaction to predict mechanisms of reaction;
7. identify classes of organic functional group with brief description of their chemistry;
8. discuss comparative chemistry of group 1A, IIA and IVA elements; and
9. describe basic properties of transition metals.

Course Contents
Historical survey of the development and importance of organic chemistry, fullerenes as fourth allotrope of carbon, uses as nanotubules, nanostructures and nano chemistry. Electronic theory in organic chemistry. Isolation and purification of organic compounds. Determination of structures of organic compounds including qualitative and quantitative analysis in organic chemistry. Nomenclature and functional group classes of organic compounds. Introductory reaction mechanism and kinetics. Stereochemistry. The chemistry of alkanes, alkenes, alkynes, alcohols, ethers, amines, alkyl halides, nitriles, aldehydes, ketones, carboxylic acids

and derivatives. The chemistry of selected metals and non-metals. Comparative chemistry of group IA, IIA and IVA elements. Introduction to transition metal chemistry.

CHM 107: General Chemistry Practical I (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out chemical experiment;
3. identify the basic glassware and equipment in the laboratory;
4. tell the differences between primary and secondary standards;
5. perform redox titration;
6. record observations and measurements in the laboratory notebooks; and
7. analyse data to arrive at scientific conclusions.

Course Contents
Laboratory experiments designed to reflect topics presented in courses CHM 101 and CHM 102. Acid-base titrations, qualitative analysis, redox reactions, gravimetric analysis, data analysis and presentation.

CHM 108: General Chemistry Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, the students should be able to:
1. identify the general laboratory rules and safety procedures;
2. collect scientific data and correctly carry out chemical experiments;
3. classify the basic glassware and equipment in the laboratory;
4. carry out preliminary tests, ignition, boiling point, melting point, test on known and unknown organic compounds;
5. execute solubility tests on known and unknown organic compounds;
6. list elemental tests on known and unknown compounds; and
7. conduct functional group/confirmatory test on known and unknown compounds which could be acidic, basic, neutral organic compounds.

Course Contents
Continuation of CHM 107. Additional laboratory experiments, functional group analysis, quantitative analysis using volumetric methods.

PHY 101: General Physics I (Mechanics) (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify and deduce the physical quantities and their units;
2. differentiate between vectors and scalars;
3. describe and evaluate motion of systems on the basis of the fundamental laws of mechanics;
4. apply Newton's laws to describe and solve simple problems of motion;
5. evaluate work, energy, velocity, momentum, acceleration, and torque of moving or rotating objects;
6. explain and apply the principles of conservation of energy, linear and angular momentum;
7. describe the laws governing motion under gravity; and

8. explain motion under gravity and quantitatively determine behaviour of objects moving under gravity.

Course Contents
Space and time, units and dimension, vectors and scalars, differentiation of vectors: displacement, velocity and acceleration, kinematics, Newton laws of motion (Inertial frames, Impulse, force and action at a distance and momentum conservation). Relative motion, application of Newtonian mechanics, equations of motion, conservation principles in physics, conservative forces, conservation of linear momentum, kinetic energy and work, potential energy, system of particles, centre of mass, rotational motion, torque, vector product, moment, rotation of coordinate axes and angular momentum. Polar coordinates, conservation of angular momentum, circular motion, moments of inertia, gyroscopes and precession. Gravitation, Newton's Law of gravitation, Kepler's Laws of planetary motion, gravitational potential energy, escape velocity, satellites motion and orbits.

PHY 102: General Physics II (Electricity and Magnetism) (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the electric field and potential and related concepts, for stationary charges;
2. calculate electrostatic properties of simple charge distribution using Coulomb's law, Gauss's law and electric potential;
3. describe and determine the magnetic field for steady and moving charges;
4. determine the magnetic properties of simple current distributions using Biot-Savart and Ampere's law;
5. describe electromagnetic induction and related concepts and make calculations using Faraday and Lenz's laws;
6. explain the basic physical of Maxwell's equations in integral form;
7. evaluate DC circuits to determine the electrical parameters; and
8. determine the characteristics of ac voltages and currents in resistors, capacitors and inductors.

Course Contents
Forces in nature. Electrostatics. Electric charge and its properties. Methods of charging. Coulomb's law and superposition. Electric field and potential. Gauss's law. Capacitance. Electric dipoles. Energy in electric fields. Conductors and insulators. Current, voltage and resistance. Ohm's law and analysis of DC circuits. Magnetic fields. Lorentz force. Biot-Savart and Ampère's laws. Magnetic dipoles. Dielectrics, energy in magnetic fields. Electromotive force. Electromagnetic induction. Self and mutual inductances. Faraday and Lenz's laws. Step up and step down transformers. Maxwell's equations. Electromagnetic oscillations and waves. AC voltages and currents applied to inductors. Capacitors, resistance and combinations.

PHY 107: General Practical Physics I (1 Unit C: PH 45)

Learning Outcomes
On Completion of the course, students should be able to:
1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs; and
5. draw conclusions from numerical and graphical analysis of data.

Course Contents
This introductory course emphasises quantitative measurements, the treatment of measurement errors and graphical analysis. A variety of experimental techniques should be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, covered in PHY 101. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

PHY 108: General Practical Physics II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct measurements of some physical quantities;
2. make observations of events, collect and tabulate data;
3. identify and evaluate some common experimental errors;
4. plot and analyse graphs;
5. draw conclusions from numerical and graphical analysis of data; and
6. prepare and present practical reports.

Course Contents
This introductory course emphasises quantitative measurements, the treatment of measurement errors and graphical analysis. A variety of experimental techniques should be employed. The experiments include studies of meters, the oscilloscope, mechanical systems, electrical and mechanical resonant systems, light, heat, viscosity, covered in PHY 102. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

200 Level

ENT 211: Entrepreneurship and Innovation (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the concepts and theories of entrepreneurship, intrapreneurship, opportunity seeking, new value creation, and risk taking;
2. state the characteristics of an entrepreneur;
3. analyse the importance of micro and small businesses in wealth creation, employment and financial independence;
4. engage in entrepreneurial thinking;
5. identify key elements in innovation;
6. describe stages in enterprise formation, partnership and networking including business planning;
7. describe contemporary entrepreneurial issues in Nigeria, Africa and the rest of the world; and
8. state the basic principles of e-commerce.

Course Contents
Concept of entrepreneurship (entrepreneurship, intrapreneurship/corporate entrepreneurship). Theories, rationale and relevance of entrepreneurship (schumpeterian and other perspectives, risk-taking, necessity and opportunity-based entrepreneurship and creative destruction). Characteristics of entrepreneurs (opportunity seeker, risk taker, natural and nurtured, problem solver and change agent, innovator and creative thinker).

Entrepreneurial thinking (critical thinking, reflective thinking, and creative thinking). Innovation (concept of innovation, dimensions of innovation, change and innovation, knowledge and innovation). Enterprise formation, partnership and networking (basics of business plan, forms of business ownership, business registration and forming alliances and joint ventures). Contemporary entrepreneurship issues (knowledge, skills and technology, intellectual property, virtual office, networking). Entrepreneurship in Nigeria (biography of inspirational entrepreneurs, youth and women entrepreneurship, entrepreneurship support institutions, youth enterprise networks and environmental and cultural barriers to entrepreneurship). Basic principles of e-commerce.

ANA 201: Introductory Anatomy, Gross Anatomy of Upper Limbs (3 Units C: LH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. classify the basic divisions of anatomy into regional, systemic and applied anatomy;
2. demonstrate knowledge of anatomical terms, anatomical positions, planes, relationships and comparisons, laterality and movement;
3. identify the shape, two ends, bony markings, and relations of surfaces of the clavicle;
4. identify the articular surfaces, types, capsules, ligaments and neurovascular supply to the SC and AC joints;
5. identify the articular surfaces, shaft and bony markings of the Humerus;
6. identify the articular surfaces, type, joint capsule, extrinsic and extrinsic ligaments and neurovascular supply to the shoulder joint;
7. describe the ends, articular surfaces, shafts, bony markings and processes of the two forearm bones;
8. identify the shape, boundaries and contents of the axilla;
9. describe the articular surfaces, type, capsule, ligaments, range of movement and neurovascular supply of the elbow joint;
10. describe the attachment and orientation of the fibers of the interosseous membrane;
11. identify the names, relations and articulations of the two rows of carpal bones;
12. identify the shapes, bases and heads of metatarsals and their articulations;
13. discuss the attachments, actions and innervations of the axioappendicular and scapulohumeral muscles;
14. differentiate the boundaries and contents of carpal tunnel; and
15. identify the number and compartments of hand muscles and describe the neurovascular bundle of the hand.

Course Contents

Descriptive terms. Plans and terms of relationship of the human body. Terms of comparison. Attachment of muscles. Types of muscles. Movements of joints. Osteology. Principles of Kinesiology. General organisation of body systems. Upper limb. Pectoral region and mammary gland. Axilla and brachial plexus. Deltoid and scapular regions. Arm, forearm, hand, bones and joints.

ANA 203: Histology of Basic Tissues (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the ultrastructure of a cell;
2. identify the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;

3. enumerate the components of extracellular matrix, fibres and ground substance;
4. identify the collagen and elastic fibres;
5. state the proteins of the ground substance;
6. identify the reticuloendothelial system and the various ways of classifying epithelial tissue;
7. explain the epithelial specialisations of the luminal and abluminal surfaces;
8. state the differences between microvilli, cilia and stereocilia;
9. explain the classifications of glands via morphology and method of secretion;
10. describe the light and electron microscopic pictures of muscle tissue;
11. state the ultrastructure of a neuron and the basic neuronal types;
12. explain synapses between neurons and motor end plates;
13. define myelination of nerve fibres and describe the structure of a peripheral nerve;
14. enumerate the supporting cells of the neurons centrally and peripherally; and
15. identify the structure of sense receptors, free nerve endings, Meissner's and Pacinian corpuscles and muscle spindle.

Course Contents
Components of the cell. Cell cycle. Chromosomes. Protein secretion and transcription of DNA. Introduction to light microscopy. Electron microscopy and units of measurement. Basic tissues of the body. The epithelial, connective and endothelial tissues. Muscle and nervous tissue. Lymphoid organs.

ANA 205: General Embryology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify gametogenesis and compare the process in male and female;
2. classify the hormonal, ovarian and endometrial cycles, and how they are interconnected;
3. enumerate the preconditions, phases and consequences of fertilization and describe cleavage and implantation;
4. describe the second week of development as the week of twos, cytotrophoblast and syncytiotrophoblast, epiblast and hypoblast, somatopleura and splanchnopleure, amniotic and yolk sac cavities;
5. discuss the establishment of body axes and fate maps during the gastrulation period (third week) and the role of genes in such process;
6. explain further development of the trophoblast during the third week of development;
7. identify the derivatives of the three germ layers and how they develop during the embryonic period (third to eighth week); and
8. describe the development of placenta and fetal membranes.

Course Contents
Gametogenesis. Cyclic changes in the female genital tract. Fertilization, cleavage, blastocyst, gastrulation and formation of germ layers. Segmentation of mesoderm. Folding of embryo foetal membranes. Umbilical cord and placentation. Development of limbs and teratology. Developmental anomalies and their clinical syndromes.

ANA 207: Practical Work (4 Units C: PH 180)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct practicals according to the contents of ANA 201 to 205.

Course Contents
Practical teaching according to the contents of ANA 201 to 205.

PHS 201: Introductory Physiology and the Autonomic Nervous System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
2. describe functional organisation of human body;
3. identify the concept of homeostasis and its failure (illness);
4. explain control systems of the body;
5. describe cell membrane and its functions;
6. recognise various cell organelles and intercellular connections;
7. describe various mechanisms of transport across cell membrane including active transport, passive transport, simple and facilitated diffusion;
8. identify the structure neuron and functions;
9. classify nerve fibres and nerve injury;
10. classify conduction of nerve impulse, nerve degeneration and regeneration;
11. describe synapses and neuromuscular junction;
12. classify muscles;
13. discuss skeletal muscle contraction and excitation-contraction coupling;
14. identify smooth muscle contraction;
15. appreciate nerve conduction studies;
16. interpret electromyograms (EMG);
17. explain rigor mortis and contractures;
18. describe myopathies/neuropathies;
19. describe functional organisation of autonomic nervous system;
20. discuss sympathetic division of autonomic nervous system;
21. discuss parasympathetic division of autonomic nervous system;
22. outline functions of autonomic nervous system;
23. enumerate sympathomimetic and sympatholytic drugs; and
24. list parasympathomimetic and parasympatholytic drugs.

Course Contents
Introduction to physiology and its place in Medicine. The composite cell, cell membrane and transport mechanisms, membrane potentials. Physiology of excitable tissues. Functional organization of autonomic nervous system (ANS). Basic characteristics of sympathetic and parasympathetic divisions. Introduction to human genetics. Biotechnology and human genome.

PHS 203: Blood Physiology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. classify the composition and functions of blood;
2. enumerate plasma proteins, albumin, globulin fibrinogen, and their functions;
3. explain red blood cells formation, erythropoiesis, hemoglobin and iron metabolism;
4. discuss various types of anaemia;
5. identify blood indices in various disorders, thalassemia;
6. describe white blood cells formation, leucopoiesis and functions;
7. discuss platelets, haemostasis, clotting factors and anticoagulants;
8. explain thrombocytopenia, clotting disorders, haemophilia;

9. describe the principles of blood grouping and blood transfusion reactions;
10. explain reticuloendothelial system;
11. define immunity and its classification;
12. describe the process of development of cell-mediated immunity;
13. explain the process of development of humoral immunity;
14. discuss physiological basis of immunisation; and
15. describe autoimmune diseases, allergy and immunological hypersensitivity reactions.

Course Contents
General characteristics and functions of blood. Properties and functions of plasma. Red blood cells factors involved in erythropoiesis, blood groups. White blood cells, origin, type, properties, functions, antigenicity and immunities. Platelets and hemostatic mechanisms. Reticulo-endothelial system. Clotting and fibrinolytic systems. Immunity and immunodeficiency disease and HIV.

PHS 205: The Cardiovascular System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the functional organisation of the heart and circulation;
2. enumerate properties of cardiac muscle and conduction system of the heart;
3. explain pace-maker potential and artificial pacemaker;
4. define cardiac cycle and its regulation;
5. state correlate cardiac cycle;
6. discuss electrocardiogram (ECG) and heart sounds;
7. demonstrate ECG-recording and interpretation;
8. explain mechanism of development of arrhythmias;
9. classify blood vessels;
10. explain the mechanism of local control of blood flow;
11. discuss cardiac output measurement and regulation;
12. evaluate arterial pulse;
13. evaluate arterial blood pressure;
14. explain foetal circulation and readjustments at birth; and
15. discuss vascular endothelium in cardiovascular control.

Course Contents
Overall plan and functions of the C.V.S. Physiologic anatomy of the heart. Mechanical events of cardiac cycle, cardiac output and its estimation. E.C.G. The Vascular system. Cross sectional area of different vascular groups, systolic, diastolic, pulse and mean pressures, exchange of fluids across the capillaries, venous and central venous pressures. Integration of C.V.S functions, central control centres, regulation of systemic blood pressure. Cardio-vascular adaptations in health and disease. Circulation through special areas. Vascular endothelium in cardiovascular control.

BCH 201: Cell Biology, PH and Buffer (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the role of electro transport chain and oxidative phosphorylation in the generation of ATP;
2. define genetic;
3. explain structure of chemistry and function of normal living cell;

4. discuss metabolism of proteins;
5. describe carbohydrates, nucleic acids and lipids;
6. illustrate basic biochemical importance; and
7. apply biochemical knowledge in the clinics.

Course Contents
Introduction to Biochemistry. Review of concepts in chemistry applicable to biological systems, chemical bonds covalent and ionic, biomolecules, elementary thermodynamics, reaction equilibria. Henderson equation application. Water, physical, biological and chemical properties. Acid-base chemistry, buffer systems and application to living systems. Introduction of terms used to describe acid-base disorders in the body, academia, alkalemia, acidosis and alkalosis. Enzymes, their properties and kinetics. Diversity of biomolecules, carbohydrates, lipids, proteins, amino acids and nucleic acids in nature. Structure, properties, and biochemical/biological functions of carbohydrates. Lipids, amino acids, proteins and nucleic acids.

BCH: 203 Carbohydrate Chemistry (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain classification and chemistry of carbohydrate;
2. discuss chemistry and biochemistry of the polysaccharide including the amino sugars; mucopolysaccharides, blood group substances;
3. illustrate structure of chemistry and function of normal living cell;
4. define metabolism of proteins;
5. describe carbohydrates, nucleic acids and lipids;
6. demonstrate basic biochemical importance; and
7. apply biochemical knowledge in the clinics.

Course Contents
Classification and chemistry of carbohydrate. Chemistry and biochemistry of the polysaccharide including the amino sugars, mucopolysaccharides, blood group substances.

BCH 205: Amino Acids Chemistry (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain chemistry and structure of the amino acids;
2. classify peptides, essential and non-essential amino acids;
3. define metabolism of proteins;
4. describe carbohydrates, nucleic acids and lipids;
5. illustrate how to apply correctly and interpret the results if different diagnostic test (for example, creatinine, urea, PS) in human diseases; and
6. apply biochemical knowledge in the clinics.

Course Contents
Chemistry and structure of the amino acids. Peptides, essential and non-essential amino acids.

BCH 207: Biochemistry Practical I (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:

1. determine serum electrolyte;
2. recognise urea;
3. identify creatinine;
4. identify serum bilirubin;
5. recognise uric acid;
6. classify liver enzymes (ALT, AST and ALP); and
7. apply biochemical knowledge in the clinics.

Course Contents
Serum electrolyte determination. Urea determination. Creatinine determination. Serum bilirubin determination. Uric acid determination. Serum liver enzymes determination (ALT, AST and ALP).

BCH 209: Lipid Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define lipids;
2. enumerate classification, chemistry and function of lipids;
3. explain digestion and absorption of lipids in the bloodstream;
4. identify the lipoproteins; and
5. apply biochemical knowledge in the clinics.

Course Contents
Introduction to lipids, classification, chemistry and function of lipids. Digestion and absorption of lipids in the bloodstream. The lipoproteins.

CSS 201: Clinical Skills I (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate practical application of knowledge acquired in basic medical and basic clinical sciences;
2. apply practical knowledge acquired in basic medical and basic clinical sciences;
3. enhance early clinical exposure;
4. identify clinical skills; and
5. emphasise early acquisition of clinical skills.

Course Contents
Clinical application of basic medical and basic clinical sciences. Clinical skills. Principles of courses taught in basic medical and basic clinical science.

GST 212: Philosophy, Logic and Human Existence (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. know the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy and the centrality of logic in philosophical discourse;
3. know the elementary rules of reasoning;
4. distinguish between valid and invalid arguments;
5. think critically and assess arguments in texts, conversations and day-to-day discussions;

6. critically asses the rationality or otherwise of human conduct under different existential conditions;
7. develop the capacity to extrapolate and deploy expertise in logic to other areas of knowledge; and
8. guide his or her actions, using the knowledge and expertise acquired in philosophy and logic.

Course Contents
Scope of philosophy, notions, meanings, branches and problems of philosophy. Logic as an indispensable tool of philosophy. Elements of syllogism, symbolic logic-the first nine rules of inference. Informal fallacies, laws of thought, nature of arguments. Valid and invalid arguments, logic of form and logic of content-deduction, induction and inferences. Creative and critical thinking. Impact of philosophy on human existence. Philosophy and politics, philosophy and human conduct, philosophy and religion, philosophy and human values, philosophy and character molding.

ANA 202a: Gross Anatomy of Thorax and Abdomen (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the bones and joints of the thoracic cavity;
2. differentiate the muscles of respiration in terms of attachment, actions and neurovascular supply;
3. describe the neurovasculature of the thoracic wall, pleurae, lungs and the tracheobronchial tree;
4. describe the surfaces, borders, apex, fissures and the root of the lungs;
5. enumerate the 18-20 bronchopulmonary segments;
6. explain the layers and neurovascular supply of the pericardium as well as the pericardial space and sinuses;
7. identify the position, shape, surfaces, base, apex and borders of the heart;
8. differentiate the external and internal features of the heart chambers;
9. distinguish the fibrous skeleton and conducting system of the heart;
10. identify the vascular planes of the branches of the descending aorta;
11. explain the venous and lymphatics of the thoracic cavity;
12. describe the course of vagus and phrenic nerves in the thoracic cavity as well as the formation of autonomic nervous plexus in the thorax;
13. enumerate the course of trachea and oesophagus in the thoracic cavity;
14. list the attachments, actions and neurovascular supply of the diaphragm;
15. explain the divisions and communications of the peritoneal cavity;
16. identify the external and internal features as well as the neurovascular supply of the abdominal oesophagus; stomach, small and large intestine;
17. identify the external features, surfaces, borders and relations of the liver;
18. explain the parts of the gallbladder, its relations and neurovascular supply as well the extrahepatic biliary tree;
19. list the parts, relations and neurovascular supply of the pancreas;
20. describe the surfaces, borders, relations and neurovascular supply of the spleen;
21. identify the attachments of the renal fascia; and
22. discuss the relations and neurovascular supply of the kidneys and the suprarenal glands.

Course Contents
Thorax, thoracic wall, pleura, lungs. Heart and coronary vessels mediastinum and diaphragm. Abdomen, anterior abdominal wall, external genitalia, peritoneum, stomach and intestines,

blood supply. Liver and gall bladder, pancreas, spleen, kidneys and suprarenal. Pelvis and surface anatomy. Radiological anatomy.

ANA 202b: Gross Anatomy of Pelvis and Perineum (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate the three bones forming the wall of the pelvic cavity;
2. explain the articular surfaces and ligaments of the sacroiliac and lumbosacral joints as well as those of pubic symphysis;
3. identify the boundaries and planes of pelvic inlet and outlet as well as the axis of the pelvic cavity;
4. distinguish the various pelvic diameters and pelvic types;
5. describe the attachments, actions and neurovascular supply of the muscles forming the floor, lateral and posterior walls of the pelvic cavity;
6. identify the endopelvic fascia and its condensations;
7. enumerate the external and internal features of the rectum as well as its neurovascular supply;
8. list the external and internal features of the urinary bladder and its neurovascular supply;
9. describe the relations and neurovasculature of prostate;
10. explain the relations, external and internal features of the uterine tubes, uterus and vagina as well as their neurovasculature;
11. identify the divisions of perineum;
12. explain the male external genitalia and their neurovascular supply;
13. explain the female external genitalia and their microvasculature; and
14. discuss the boundaries and contents of ischiorectal fossa.

Course Contents
Perineum. Male and female perineum. Pelvic wall and floor. Pelvic peritoneum. Pelvic viscera. Sympathetic and parasympathetic neurovascular structures. Surface anatomy. Radiological anatomy.

ANA 204: Systemic Histology (Organology) (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define the ultrastructure of a cell;
2. describe the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;
3. identify the collagen and elastic fibres;
4. define the proteins of the ground substance;
5. describe the light microscopic features of the three heart layers including histology of the conducting system;
6. conduct the light microscopy of the elastic, muscular arteries and arterioles;
7. list the ultrastructure of the three types of endothelia;
8. identify the structure of veins;
9. explain the structure of lymphatic vessels and lymphoid organs including spleen;
10. describe the light microscopic picture of skin layers and structure of its appendages.;
11. explain the peculiarities of the thick skin of palms and soles;
12. describe the basic structure of the respiratory epithelium;
13. explain the structure of olfactory epithelium;
14. illustrate the basic arrangement of structures in the wall of airway;

15. describe the ultrastructure of blood-air barrier;
16. discuss the basic organisation of the wall of the gastrointestinal tract;
17. describe the light microscopic structure of all the different parts of the digestive tract;
18. describe the light microscopic structure of liver, pancreas and biliary tree;
19. explain the light microscopic structure of the different segments of nephron;
20. illustrate the ultrastructure of the glomerulus and the filtration barrier;
21. conduct the light microscopy of the prostate, erectile bodies and prepuce;
22. describe the light microscopic picture of the ovarian and endometrial cycles;
23. explain the light microscopic picture of the cervix and vagina;
24. describe female breast in various stages of development;
25. describe the light microscopic structure of the auricle, ear drum and membrane lining the tympanic cavity;
26. explain the light microscopic picture of the membranous labyrinth of the inner ear including the maculae, cristae and organ or Corti;
27. describe the light microscopic picture of eyelids, conjunctivae and the lens; and
28. list the layers of the eyeball and the layers of retina.

Course Contents
Cardiovascular system. Skin, gland of the skin. Structure of the nails and hair. Respiratory system. Digestive system. Neurological system. Musculo-skeletal system. Urinary and genital systems. Electron micrograph studies of each organ.

ANA 206: Systemic Embryology (Organogenesis) (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe gametogenesis and compare the process in male and female;
2. appraise the hormonal, ovarian and endometrial cycles and how they are interconnected;
3. list the preconditions, phases and consequences of fertilization;
4. describe cleavage and implantation;
5. explain the second week of development as the week of twos, cytotrophoblast and syncytiotrophoblast, epiblast and hypoblast, somatopleura and splanchnopleure, amniotic and yolk sac cavities;
6. discuss the establishment of body axes and fate maps during the gastrulation period (third week) and the role of genes in such process and illustrate the further development of the trophoblast during the third week of development;
7. discuss the derivatives of the three germ layers and how they develop during the embryonic period (third to eighth week); and
8. describe the development of placenta and fetal membranes.

Course Contents
Development of cardiovascular system, integumentary system, respiratory system, digestive system, urogenital system, nervous system. Developmental anomalies and their clinical syndromes.

ANA 208: Practical Work (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct practicals according to the contents of ANA 202 to 206.

Course Contents
Practical teaching according to the contents of ANA 202 to 206.

PHS 202: Renal Physiology, Body Fluids and Temperature Regulation (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the structure of kidney and nephron;
2. list general functions of kidney;
3. describe GFR and factors regulating it;
4. explain the process of urine formation, filtration, reabsorption and secretion;
5. discuss the processes producing concentrated and diluted urine;
6. describe the regulation of blood pressure by kidneys;
7. list the hormones of kidney;
8. define acidification of urine;
9. conduct renal function tests;
10. discuss renal failure and haemodialysis; and
11. describe micturition reflex and abnormalities of micturition including incontinence.

Course Contents
The skin. Functional anatomy, temperature regulations, abnormalities of temperature regulation. Metabolism, factors regulating metabolism, conditions for measuring basal metabolic rate. Compartmentalization and composition of body fluids. Physiologic anatomy of the kidney, renal circulation and autoregulation. Glomerular filtration. Tubular transport. Urine formation, counter-current system. Water volume and ionic regulation. Acid-base balance. Micturition. Abnormalities of renal function.

PHS 204: Respiratory System (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the functional organisation of respiratory tract;
2. outline functions of lungs, respiratory and non-respiratory;
3. explain the mechanics of breathing;
4. discuss the role of surfactant compliance;
5. describe lung volumes and capacities;
6. discuss respiratory changes during exercise, mechanism of sneezing, yawning, cough;
7. explain obstructive/restrictive lung disease, FEV1/FVC;
8. differentiate types of respiratory failure, types I and II, artificial respiration; and
9. explain oxygen therapy and its toxicity.

Course Contents
Physiologic anatomy of respiratory apparatus. Brief review of relevant gas laws. Lung volumes. Mechanics of breathing. Gas diffusion through alveoli, capillary membrane. Pulmonary circulation, ventilation perfusion ratio. O2 and CO2 transport. Control of respiration, hypoxias, O2 treatment, abnormal types of breathing. Altitude and depth acclimatization. Respiratory adjustments in health and disease. Aerospace physiology. Deep sea diving.

PHS 206: Neuroscience I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the functional organisation of nervous system;
2. classify nerve fibres;
3. describe the properties of synaptic transmission;
4. outline neurotransmitters and neuropeptides;
5. classify types and functions of sensory receptors;
6. describe structure and functions of spinal cord;
7. identify reflex action and other reflexes;
8. describe muscle spindle and muscle tone, tactile, temperature and pain sensations;
9. explain the structure and functions of cerebral cortex;
10. describe motor pathways (pyramidal and extra pyramidal);
11. discuss basal ganglia, its connections and functions;
12. describe cerebellum, its connections and functions;
13. explain vestibular apparatus and regulation of posture and equilibrium, physiology of sleep and sleep disorders;
14. describe electroencephalogram (EEG) Physiology of memory, physiology of speech and its bnormalities;
15. identify thalamus- nuclei, functions and thalamic syndrome;
16. describe hypothalamus and limbic system;
17. explain analgesia system of the body, disorders of cranial nerves; and
18. describe higher mental function assessment.

Course Contents
Development and general plan of the central nervous system. Nerve morphology, generation and conduction of action potential. Sensory division of the nervous system, morphology receptors, sensory pathways, reticular formation, thalamus and sensory cortex.

BCH 202: Nucleic Acids Chemistry (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe genome organisation and biosynthesis of proteins;
2. explain metabolism of purines and pyrimidines, nucleosides and nucleotides;
3. identify abnormalities in nucleic acid metabolism-xeroderma pigmentation and skin cancer;
4. explain overview of nitrogen metabolism;
5. define biosynthesis of amino acids and identify molecules derived from amino acids and biosynthesis;
6. discuss degradation of nucleotides; and
7. apply biochemical knowledge in the clinics.

Course Contents
Genome organisation and biosynthesis of proteins. Metabolism of purines and pyrimidines, nucleosides and nucleotides. Abnormalities in nucleic acid metabolism-xeroderma pigmentation and skin cancer. Overview of nitrogen metabolism, biosynthesis of amino acids. Molecules derived from amino acids and biosynthesis and degradation of nucleotides.

BCH 204: Enzymes, Coenzymes and Bioenergetics (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define enzymes and enumerate functions, nature and properties of enzymes;
2. describe kinetics of enzyme action;
3. enumerate allosteric effects;
4. explain enzyme assay in clinical medicine and immobilised enzymes;
5. identify hybridoma technology and monoclonal antibodies in medicine and biological research;
6. discuss the role of electron transport chain and oxidative phosphorylation in the generation of ATP, theories and models proposed for ATP generation; and
7. apply biochemical knowledge in the clinic.

Course Contents
Introduction to enzymes. Properties and functions, nature and properties of enzymes. Kinetics of enzyme action, allosteric effects. Enzyme assay in clinical medicine, immobilised enzymes, hybridoma technology and monoclonal antibodies in medicine and biological research. The role of electron transport chain and oxidative phosphorylation in the generation of ATP, theories and models proposed for ATP generation.

BCH 206: Amino Acids Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define the metabolism of amino acid;
2. outline transamination, oxidative deamination, decarboxylation;
3. discuss the urea cycle and its biochemical importance;
4. explain inborn errors of metabolism of some amino acids;
5. outline phenylketonuria, tyrosinosis, alkaptonuria, albinism, cystinuria; and
6. apply biochemical knowledge in the clinics.

Course Contents
Introduction to the metabolism of amino acid. Transamination, oxidative deamination, decarboxylation. The urea cycle and its biochemical importance's. Inborn errors of metabolism of some amino acids, phenylketonuria, tyrosinosis, alkaptonuria, albinism, cystinuria.

BCH 208: Carbohydrate Metabolism (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline glycolysis (Embden- Meyerhof pathway), aerobic and anaerobic phases;
2. explain the control mechanisms and substrate level phosphorylation;
3. illustrate the kerb's cycle/citric acid cycle;
4. discuss metabolism of galactose and fructose the uronic acid pathway gluconeogenesis, glycogenesis and glycogenolysis;
5. explain the HMP shunt and its biochemical importance; and
6. apply biochemical knowledge in the clinics.

Course Contents
Glycolysis (Embden- Meyerhof pathway), aerobic and anaerobic phases. Control mechanisms and substrate level phosphorylation. The kerb's cycle/citric acid cycle. Metabolism of galactose

and fructose the uronic acid pathway gluconeogenesis, glycogenesis and glycogenolysis. The HMP shunt and its biochemical importance.

BCH 210: Biochemistry Practical II (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain practical and theoretical knowledge of the biochemical basis of human diseases;
2. describe serum cholesterol determination;
3. illustrate lipoprotein determination;
4. demonstrate an understanding of the nature, properties and clinical importance of enzymes;
5. interpret the results of different diagnostic test in human diseases; and
6. apply biochemical knowledge in the clinics.

Course Contents
Serum cholesterol determination. Lipoprotein determination.

MDH 202: Multidisciplinary Healthcare (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the inter-relationship between the different healthcare professionals;
2. outline complimentary roles in healthcare delivery;
3. discuss a broad based knowledge in applied medical sciences and an early orientation to multidisciplinary healthcare delivery;
4. appreciate early orientation to multidisciplinary healthcare delivery;
5. prioritise unity team approach to patient care; and
6. define basic medical terms and components of the medical interview.

Course Contents
Moral Philosophy. Clinical ethics and professionalism. Communication/interviewing skills healthcare delivery as an inter-disciplinary profession. Human resource for health. Introduction to the roles of various healthcare specialists in MHD, complimentary and alternate Medicine, human Nutrition, critical care medicine, psychology, complementary and Alternative Medicine. Herbal and traditional medicine. Spiritual medicine. Energy and mind-body medicine. Biologically based medical practice. Public health aspects of CAM.
Medical jurisprudence and professional liability issues.

CSS 202: Clinical Skills II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate practical application of knowledge acquired in basic medical and basic clinical sciences;
2. apply practical knowledge acquired in basic medical and basic clinical sciences;
3. develop early clinical exposure;
4. identify clinical skills; and
5. recognise early acquisition of clinical skills.

Course Contents
Clinical application of basic medical and basic clinical sciences. Clinical skills. Principles of courses taught in basic medical and basic clinical science.

300 Level

ANA 301: Gross Anatomy of Head and Neck and Neuroanatomy (4 Units C: LH 60)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the features of the cervical vertebrae and articulations between them;
2. discuss the articular surfaces, ligaments and movements of the atlantooccipital and atlantoaxial joints;
3. identify the parts of hyoid bone;
4. outline the different layers of the cervical fasciae and their attachments;
5. differentiate the boundaries and contents of different regions and triangles of the neck;
6. explain the formation and the sensory and motor branches of the cervical plexus of nerves;
7. identify the structures of the root of the neck and describe the external features and neurovascular supply of thyroid gland;
8. discuss how the different cartilages, ligaments and muscles of the larynx articulate and attach to produce the whole structure;
9. describe the neurovascular supply to the larynx;
10. explain the attachments of constrictors and inner longitudinal layer of the pharynx as well as their neurovasculature;
11. identify the internal features of the different parts of the pharynx;
12. describe the different surfaces of articulated neuro- and viscerocranium and illustrate the layers of scalp;
13. list the muscles of face around the orbital, nasal and oral orifices in terms of attachments and functions; and
14. discuss the neurovasculature of the scalp and face.

Course Contents
Head and neck. Face and scalp. Back and spinal cord. Cranial cavity. Orbit, parotid, temporal and infratemporal regions. Triangles of neck, submandibular region, nerves and vessels in deep dissection of neck. Thyroid and parathyroid. Pre-vertebral region and joints of neck. Mouth and tongue, pharynx, palato-nasal cavity and sinuses, larynx, ear and eye.
Neuroanatomy. Meninges, base of brain and blood supply, hindbrain, medulla, pons, cerebellum and 4th ventricle, midbrain, diencephalon and third ventricle, cerebral hemispheres, sulci and gyri, internal structure of cerebrum and lateral ventricle, basal nuclei, 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 Head and Neck. Brain and spinal cord.

ANA 303: Histology of Special Senses and Neuro-Histology/Histo-Chemistry (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define the ultrastructure of a cell;

2. describe the light microscopic features of fibroblasts, chondrocytes, osteocytes, adipocytes, red cells, platelets and red cells;
3. explain the collagen and elastic fibres;
4. describe the proteins of the ground substance;
5. define the reticuloendothelial system;
6. discuss the various ways of classifying epithelial tissue;
7. outline the epithelial specialisations of the luminal and abluminal surfaces;
8. differentiate between microvilli, cilia and stereocilia;
9. explain the classifications of glands via morphology and method of secretion;
10. describe the light and electron microscopic pictures of muscle tissue;
11. identify synapses between neurons and motor end plates;
12. define myelination of nerve fibres and describe the structure of a peripheral nerve;
13. outline the supporting cells of the neurons centrally and peripherally;
14. explain the structure of sense receptors, free nerve endings, Meissner's and Pacinian corpuscles and muscle spindle;
15. describe the light microscopic features of the three heart layers including histology of the conducting system;
16. demonstrate the light microscopy of the elastic, muscular arteries and arterioles;
17. enumerate the ultrastructure of the three types of endothelia;
18. define the structure of veins;
19. describe the structure of lymphatic vessels and lymphoid organs including spleen;
20. discuss the light microscopic picture of skin layers and structure of its appendages;
21. outline the peculiarities of the thick skin of palms and soles;
22. describe the basic structure of the respiratory epithelium;
23. define the structure of olfactory epithelium;
24. explain the basic arrangement of structures in the wall of airway;
25. discuss the light microscopic picture of the membranous labyrinth of the inner ear including the maculae, cristae and organ or Corti;
26. describe the light microscopic picture of eyelids, conjunctivae and the lens;
27. identify the layers of the eyeball;
28. state the layers of retina;
29. describe stained sections of the spinal cord and brainstem at various levels; and
30. distinguish the cortical layers of the cerebrum and cerebellum.

Course Contents
Neurohistology. Spinal cord, brain stem, cerebrum and cerebellum. Organs of special senses, sensory receptors, eyes, ear and nose. Histology of endocrine organs. Principles and techniques of histochemistry including immunocytochemistry.

ANA 305: Neuro-Embryology and Development of Pharyngeal Apparatus
(1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain gametogenesis and compare the process in male and female;
2. describe the hormonal, ovarian and endometrial cycles and how they are interconnected;
3. outline the preconditions, phases and consequences of fertilization;
4. describe cleavage and implantation;
5. discuss the establishment of body axes and fate maps during the gastrulation period, third week and the role of genes in such process;
6. explain further development of the trophoblast during the third week of development;

7. outline the derivatives of the three germ layers and how they develop during the embryonic period, third to eighth week;
8. describe the development of placenta and fetal membranes;
9. explain the development of membranous and cartilaginous neurocranium;
10. describe the development of the limbs and the vertebral column;
11. outline the development of cardiac loop, sinus venosus as well as cardiac septa;
12. describe the development of aortic arches and the venous system;
13. explain fetal circulation and the transition happening after birth;
14. describe the development of the respiratory bud and the origins of the respiratory epithelium, smooth muscle and cartilages;
15. discuss the formation of body cavity and the diaphragm;
16. describe the developments of the derivatives of the foregut, its artery as well as dorsal and ventral mesentry;
17. outline the development of the midgut, its rotation and its artery and dorsal mesentry;
18. describe the development of the hindgut;
19. explain the developments of the three systems of kidneys and that of the excretory and collecting system of the kidneys;
20. describe the developments of bladder in urethra from the upper and pelvic parts of the urogenital sinus and contrast the process in males and females;
21. explain and compare and contrast the development of gonads and genital tracts in males and females and explain the role of genes and hormones in this process;
22. compare and contrast the development of external genitalia in males and females and the roles of genes and hormones in this process;
23. outline the derivatives of the pharyngeal arches, pouches and clefts;
24. explain the developments and origins of the three parts of the ear; and
25. describe the development of eyelids, conjunctival sac, lens vesicle and eyeball.

Course Contents
Development of the face, pharyngeal derivatives and teratology. Development of nervous system and sense organs. Developmental anomalies and their clinical syndromes.

ANA 307: Human Genetics (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the chromosome theory of inheritance;
2. describe the process of cell division; mitotic and meiotic;
3. appreciate introduction to karyotyping and cytogenetic analysis techniques;
4. explain how abnormalities in chromosome number and structure arise;
5. define single gene mutations; and
6. identify the phenotypic expressions of some selected chromosomal and single gene mutation abnormalities.

Course Contents
Fundamental human genetic principles. Variation in gene expression in man. Patterns of inheritances in families (autosomal dominant, autosomal recessive, X-linked dominant, X-linked recessive, Y-linked and sex influenced). Cytogenetics, types and classification of human chromosomes. Methods of preparation of human chromosomes and Karyotyping. Types of numerical and structural chromosome aberrations and their causes. Gene hybridisation. Human genomic studies.

ANA 309: Laboratory Techniques for Light Microscopy/Gross Radiologic Techniques (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate the practical step by step method of tissue processing for light microscope study;
2. demonstrate the principles and techniques for the use of advance light microscopes;
3. classify polarising microscope, phase contrast microscope, interference microscope, dark-field microscope and ultraviolet microscope;
4. discuss basic principles of radiological imaging of human tissue;
5. identify radiological of major body structures;
6. appreciate introduction to modern imaging techniques; and
7. state precautionary measures.

Course Contents
The practical step by step method of tissue processing for light microscope study shall be taught and demonstrated. The principles and techniques for the use of advance light microscopes will be taught and where possible demonstrated. Polarising microscope. Phase contrast microscope. Interference microscope. Dark-Field microscope, and ultraviolet microscope. Basic principles of radiological imaging of human tissue. Radiological identification of major body structures. Introduction to modern imaging techniques. Precautionary measures.

ANA 311: Practical Work (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. identify organs, tissues and other structures in the head and neck region;
2. trace cause and relation of various structures and organs in the head and neck;
3. recognise variations in location and relation of anatomical structures in the head and neck;
4. demonstrate dissection techniques; and
5. and recognise histological patterns of head and neck tissues.

Course Contents
Practical work in line with the principles of ANA 301 to 307.

PHS 301: Gastrointestinal Physiology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline different parts of the GIT and their functions;
2. define the enteric nervous system;
3. explain the processes of mastication and swallowing and their control;
4. enumerate functions and movements of stomach, small intestine and large intestine;
5. list hormones of GIT and their functions;
6. discuss vomiting and its pathway;
7. explain the process of defecation and its pathway; and
8. discuss regulation of feeding and energy expenditure.

Course Contents
Physiologic anatomy of the gastrointestinal tract. Review of smooth muscle function. Secretions in the G.I.T. and their control. Movements of the gastrointestinal tract. Digestion and absorption of various food substances. Liver and its functions. Disorders of G.I.T. The Gut as an endocrine organ.

PHS 303: Endocrinology and Reproduction (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline general principles (classification, mechanism of action, feedback control) of hormones;
2. describe physiology of growth;
3. define calcium metabolism and glucose metabolism;
4. describe the functional anatomy of male reproductive system;
5. discuss spermatogenesis and semen analysis, erection and ejaculation;
6. discuss testosterone and male puberty;
7. describe the functional anatomy of female reproductive system, gonads and oogenesis;
8. discuss oestrogen and progesterone;
9. explain menstrual cycle, puberty and menopause;
10. describe the physiological changes in mother's body during pregnancy;
11. discuss physiology of parturition and lactation;
12. define contraception;
13. interpret pregnancy tests; and
14. discuss assisted fertility techniques.

Course Contents
Endocrine system. Introduction and neuroendocrine relationship. Hypothalamo-pituitary axis, Endocrine glands, normal, hypo- and hyper-functions. Other hormones of some clinical importance. Physiologic anatomy of male and female reproductive system. Male and female sex hormones. Cyclicity of hormone secretion in females. Physiology of contraception. Assisted fertility techniques.

PHS 305: Pathophysiology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline causes and mechanism of cellular adaptations, cell injury, cell death and apoptosis, cancer and aging;
2. describe the aetiology and pathogenesis of anaemias;
3. state disorders of haemostasis;
4. explain blood transfusion and its complications;
5. outline autoimmune diseases, allergy and immunological hypersensitivity reactions;
6. state and describe disorders of peripheral circulation;
7. describe disorders of cardiac rhythm and conduction;
8. outline the pathophysiology of heart failure, hypertension and ischemic heart disease;
9. differentiate obstructive and restrictive pulmonary diseases;
10. discuss pulmonary arterial hypertension and pulmonary oedema;
11. explain nephritic and nephrotic syndrome;
12. describe the pathophysiology of acute and chronic renal failure;
13. discuss tetany and pathophysiology of cramps; and
14. define acidosis and alkalosis.

Course Contents
Introduction to pathophysiology. Cellular response to persistent stress, adaptations hyperplasia, hypertrophy, metaplasia, atrophy, intracellular accumulations, cell injury death and senescence mechanisms of cell injury, programmed cell death and necrosis, cellular ageing. Pathophysiology of prolonged bleeding time, purpura, haemophilia, hemoglobinopathies, pathophysiology of sickle cell disease, thalassemia, hypersplenism. Pathophysiology of anaemia, megaloblastic anaemia, pathophysiology erythroblastosis fetalis, incompatible blood transfusion. Pathophysiology of palpitation, cardiac arrhythmia, heart block, angina pectoris, myocardial infarction, murmurs, pathophysiology of heart failure, hypertension, Reynold's disease, pulmonary embolism, pulmonary oedema, pulmonary hypertensions and cor pulmonale. Pathophysiology of cerebral blood flow disturbance (stroke), pathophysiology oedema and lymphedema, pathophysiology of syncope and postural hypotension. Respiratory distress syndrome, Pathophysiology of haemothorax hydrothorax and pneumothorax. Pathophysiology of bronchial asthma, bronchitis and pneumonia, hypoxia and cyanosis, Undine's curse, pathophysiology of respiratory acidosis. Pathophysiology of tachypnoea, apnoea and asphyxia. Pathophysiology of cough and sneezing, hiccup and yawning. Pathophysiology of albuminuria, nephritic and nephrotic syndrome, acute tubular necrosis. Glycosuria, pathophysiology of kidney stone, hydro-nephrosis, pyelonephritis and haemonephrosis. Causes of haematuria, causes of urine retention, dehydration and over-hydration.

Learning Outcomes
At the end of this course, students should be able to:
1. develop an opportunity to review the physiological concept of systems taught;
2. outline thoroughly the physiological concept of systems taught; and
3. demonstrate the concept using available equipment to medical or junior physiology students.

Course Contents
Review the Physiological concept of systems taught. Understand the physiological concept of systems taught thoroughly. Enable them to demonstrate the concept using available equipment to Medical or more junior physiology students.

PHS 309: Neuroendocrinology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the functional organisation of nervous system;
2. define nerve fibres;
3. enumerate the properties of synaptic transmission;
4. outline neurotransmitters and neuropeptides;
5. list types and functions of sensory receptors;
6. describe structure and functions of spinal cord;
7. discuss reflex action and other reflexes;
8. explain muscle spindle and muscle tone, tactile, temperature and pain sensations;
9. describe the structure and functions of cerebral cortex;
10. outline Motor pathways (pyramidal and extra pyramidal);
11. explain Basal ganglia, its connections and functions;
12. define cerebellum, its connections and functions;
13. describe vestibular apparatus and regulation of posture and equilibrium, physiology of sleep and sleep disorders, electroencephalogram (EEG) Physiology of memory, physiology of speech and its abnormalities;

14. explain thalamus- nuclei, functions and thalamic syndrome;
15. discuss hypothalamus and limbic system; and
16. describe analgesia system of the body disorders of cranial nerves and higher mental function assessment.

Course Contents
Historical origins of a Neuro-endocrine connection. A review of the physiologic anatomy of hypothalamo-pituitary link. Current concepts of channels of communication between the hypothalamus and the pituitary. Hypothalamic neurosecretions. The "master gland" of the endocrine system. Pituitary secretions and their current concepts of the servomechanisms between the hypothalamus, the pituitary and other endocrine organs.

PHS 311: Pathophysiology II (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the mechanism and causes of vomiting;
2. describe the pathophysiology of dysphagia, achalasia and upper oesophageal regurgitation;
3. discuss the pathophysiology of gastric and duodenal ulcer, intestine malabsorption, intestinal obstruction-Ileus;
4. list dysfunctions of the colon, diarrheal, constipation, irritable colon and flatulence;
5. describe acute and chronic pancreatitis;
6. differentiate various types of Hepatitis;
7. explain cirrhosis of the liver and portal hypertension;
8. differentiate cholelithiasis and cholecystitis;
9. classify jaundices and describe its pathogenesis;
10. describe the pathophysiology of starvation, malnutrition and obesity;
11. differentiate hyperfunction and hypofunction of anterior pituitary gland;
12. explain alterations of the posterior pituitary gland hormones;
13. delineate hyperthyroidism and hypothyroidism;
14. describe hypersecretion and hyposecretion of adrenal cortex hormones;
15. explain dysfunction of adrenal medulla;
16. outline diabetes mellitus, aetiology and pathogenesis;
17. discuss pathophysiology of infertility and sexual disorders;
18. explain the pathophysiology tremors, pathophysiology of basal ganglia lesions;
19. define epilepsy, and discuss its aetiology and pathogenesis;
20. outline the pathophysiology of demyelination (multiple sclerosis);
21. explain the pathophysiology of olfaction and taste abnormalities; and
22. discuss pathophysiology of depressions.

Course Contents
Pathophysiology of stomatitis, xerostomia, dysphagia, achalasia and upper oesophageal regurgitation. Pathophysiology of peptic ulcer, gastric and duodenal, pathophysiology and causes of vomiting, acute pancreatitis, pathophysiology of paralytic ileus, causes of diarrheal and constipation, irritable bowel syndrome, ulcerative colitis. Pathophysiology of jaundice, hepatitis, and cholecystitis, types of bile stones, predisposing factors for hepatic cancer and cancer head of pancreas. Pathophysiology of gigantism, acromegaly, dwarfism infantilism, Simmons disease pathophysiology of cretinism, myxoedema and Grave's disease. Pathophysiology of exophthalmos, Addison's disease, Cushing disease, virilism. Pathophysiology of male infertility, azoospermia, male chromosomal disturbances and impotence puberty disturbances, disturbance of female menstrual cycle, pathophysiology of

conception, lactation and hormones acting on mammary glands. Pathophysiology of sensory disturbances pathophysiology syringomyelia, aneuropathies, neurosyphilis, thalamic syndrome, herpes simplex. Pathophysiology of pain, types of pain, hyperalgesia algesia, and allodynia. Pathophysiology of headache. Pathophysiology of tendon jerk, knee, ankle, biceps and triceps. Pathophysiology of cerebral palsy, muscle tone changes. Pathophysiology of basal ganglia lesions. Pathophysiology of chorea, athetosis and hemiballismus. Pathophysiology of parkinsonism, pathophysiology and causes of course tremors and fine tremors. Pathophysiology of gait change, pathophysiology of social behaviour. Pathophysiology of ataxia, sensory and motor ataxia. Pathophysiology of memory disturbances, anterograde and retrograde amnesia, speech disturbance. Pathophysiology of balance and equilibrium complete and incomplete section of spinal cord. Causes of aphasia. Pathophysiology of corneal opacity, cataract, glaucoma, pathophysiology of errors of refraction, myopia, and hypermetropia, pathophysiology of visual pathway disturbance, disturbances colour vision. Deafness. Pathophysiology of hearing disturbance. Pathophysiology of anosmia, hyposomnia pathophysiology of taste disturbances, ageusia hypogeusia and dysgeusia. Pathophysiology of myasthenia gravis, muscle dystrophy, intestinal colic, sympathomimetic and sympatholytics, pathophysiology of demyelinating disease pathophysiology of muscle denervation. Pathophysiology of botulinum and tetanus toxoid, Eaton-lambert syndrome, schizophrenia, pathophysiology of depressions.

BCH 301: Metabolism of Nucleic Acids and Protein Synthesis (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline metabolism of proteins, carbohydrates, nucleic acids and lipids;
2. describe overview of nitrogen metabolism;
3. define biosynthesis of amino acids;
4. outline molecules derived from amino acids; and
5. explain biosynthesis and degradation of nucleotides.

Course Contents
Overview of nitrogen metabolism. Biosynthesis of amino acids. Molecules derived from amino acids and biosynthesis and degradation of nucleotides.

BCH 303: Integration of Metabolism (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. outline the structure, chemistry and function of normal living cell;
2. describe the nature, properties and clinical importance of enzymes;
3. enumerate the biochemical functions of biological membranes, vitamins, hormones;
4. discuss the biochemistry of ageing, nervous and muscle actions;
5. interpret the results of different diagnostic test in human diseases;
6. discuss porphyrins, haemoglobinopathies, hybridoma technology in medicine;
7. describe applications of immunotherapy assay of hormones; and
8. apply biochemical knowledge in the clinics.

Course Contents
Tissue-specific metabolism. The division of labour and hormonal regulation of fuel metabolism.

BCH 305: Nutrition (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. outline general nutrition requirement, energy aspect of diet, basal metabolic rate (BMR) and specific dynamic action (SDA);
2. enumerate the major nutritional disorder, kwashiorkor, marasmus, obesity, iron sources;
3. define absorption, distribution in the body and biochemical function excretion;
4. describe anaemia and hemochromatosis, water and the major ions, H+, Na+, K+, Ca++ HCO3;
5. explain fluid intake and output;
6. discuss total body water distribution, intracellular and extracellular fluids,
7. define trace element, calcium and phosphorus;
8. explain metabolism and significances in the body; and
9. apply biochemical knowledge in the clinics.

Course Contents
General nutrition requirement, energy aspect of diet, basal metabolic rate (BMR) and specific dynamic action (SDA). The major nutritional disorder. Kwashiorkor, marasmus, obesity, iron. Sources' absorption, distribution in the body and biochemical function excretion, anaemia, and hemochromatosis. Water and the major icons: H+, Na+, K+, Ca++ HCO3, fluid intake and output. Total body water distribution intracellular and extracellular fluids. Trace element. Calcium and phosphorus, metabolism and significances in the body.

BCH 307: Biochemical Genetics and Molecular Biology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define gene cloning and the application of recombinant DNA technology in medicine;
2. describe genetic translocation and gene rearrangement in diseases state;
3. explain application of immunotherapy, molecular and cell biology, DNA replication and transcription, RNA and relationship to DNA;
4. define genetic code;
5. outline biosynthesis of protein and regulation of gene expression;
6. discuss tools of genetic engineering (molecular biology), hybridisation, molecular cloning, southern blotting and related techniques, polymerase chain reaction (PCR) and its application to medicine;
7. describe molecular and biochemical basis of inheritance of common diseases, haemoglobinopathies;
8. outline gene therapy, biochemical aspects of cancer and cancer therapy;
9. explain personalised medicine; and
10. apply biochemical knowledge in the clinics.

Course Contents
Gene cloning and the application of recombinant DNA technology in medicine. Application of immunotherapy. Molecular and cell biology. DNA, replication and transcription. RNA and relationship to DNA. Genetic code. Biosynthesis of protein and regulation of gene expression. Tools of genetic engineering (molecular biology). Hybridisation, molecular cloning, southern blotting and related techniques, polymerase chain reaction (PCR) and its application to medicine. Molecular and biochemical basis of inheritance of common diseases,

haemoglobinopathies. Gene therapy. Biochemical aspects of cancer and cancer therapy. Personalized medicine.

BCH 309: Special Topics (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. outline endocrinology structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones;
2. describe xenobiotics and forensic biochemistry detoxification mechanisms;
3. define metabolism of foreign compounds;
4. explain induction of microsomal enzymes and drug resistance;
5. identify medico-legal, blood, urine and sweat test;
6. describe recent development in forensic techniques;
7. discuss the biochemistry of ageing, nervous and muscle actions;
8. apply knowledge of basic research methodologies in biochemistry and molecular biology;
9. interpret the results of different diagnostic test in human diseases;
10. discuss porphyrins, haemoglobinopathies, hybridoma technology in medicine;
11. outline biochemistry of the viruses, spread, detection, drug treatment and others;
12. describe applications of immunotherapy assay of hormones; and
13. review current biochemical topics.

Course Contents
Endocrinology structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones. Xenobiotics and forensic biochemistry. Detoxification mechanisms, metabolism of foreign compounds. Induction of microsomal enzymes and drug resistance. medico-legal, blood, urine and sweat test. Recent development in forensic techniques. Basic concept of aging, metabolic processes and aging, apoptosis, concept, pathways (intrinsic and extrinsic), role of oxidative stress in ageing, biochemical functions of nervous systems, neurotransmitters, biosynthesis and breakdown, diseases affecting the nervous tissues, muscles action. Biochemical and molecular concept, control. Metabolism of drugs and other foreign compounds. Cytochrome P450 and its isozymes microsomal enzymes in drugs metabolism and the toxicological consequences. The structure of biological membrane transport and diseases. Retroviruses, molecular basis and involvement in cancer. AIDS, biochemistry of the viruses, spread, detection, drug treatment and other. Cancer proto-oncogenes and oncogenes. Biochemical features of tropical disease. Gene rearrangement in Burkett's lymphoma and other disease, genetic regulation of metabolism, the operon concept, induction and repression. Review of current biochemical topics.

ORB 301: Oral Biology (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the tooth model hypotheses and amelogenesis and its stages with functions of ameloblasts;
2. list stages of dentinogenesis and the types of dentine, as well as cementogenesis and the formation of the periodontium;
3. explain the effects of age on mineralised dental tissues;
4. describe the effect of hormones on oral structures;
5. define hormones, and classify steps in their secretion;
6. outline their regulation, effects and therapeutic uses;

7. describe the effects of hypo-secretion and hyper-secretion, thyroid hormone, growth hormone, parathyroid hormone;
8. know the effect of sex hormones at different stages of puberty, pregnancy and menopause;
9. define saliva, classify salivary glands and list the components of saliva;
10. enumerate the functions of saliva and describe the structure and development of saliva; describe the clinical and applied anatomy of saliva and salivary glands, mastication, deglutition and taste;
11. define mastication and describe the functions of temporomandibular joint and muscles of mastication;
12. explain the roles of tongue, cheek and lips as aids to mastication and the 3 hypotheses for reflex control of mastication;
13. discuss masticatory efficiency and masticatory disorders as well as all the stages of deglutition;
14. enumerate the principles and basics of taste sensation;
15. describe tooth deposits and calcium metabolism;
16. define pellicle, types of pellicles and formation of pellicle including plaque and its composition;
17. differentiate the types of plaque and enumerate factors that favour its formation;
18. outline the clinical implication of plaque accumulation on tooth and the gingivae;
19. discuss the theories on mechanism of calculus formation;
20. outline and contrast types of calculus; and
21. explain calcium metabolism.

Course Contents
Introduction to odontogenesis, amelogenesis, dentinogenesis and cementogenesis. Formation of periodontium, developmental abnormalities. Effect of hormones on oral structures. Saliva, its functions, and salivary glands. Organic and inorganic constituents of saliva, mastication and deglutition, taste and its stimuli. Tooth deposits-pellicle, plaque, calculus. Calcium and phosphorus metabolism. Knowledge of all stages involved in the formation of the tooth.

DAT 301: Dental Anatomy (4 Units C: LH 45; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. identify individual teeth from each jaw and side;
2. compare and contrast teeth with similar features;
3. recognise the correct eruption sequence in primary and permanent dentition;
4. identify the appropriate name for tooth surfaces;
5. describe the tooth numbering systems used in dentistry; and
6. identify mamelons, grooves, ridges, cingula, heights of contour, tubercle, cusps, embrasure.

Course Contents
Introduction to dental anatomy. Basic nomenclature and introduction to the 3D tooth atlas. Morphology of the permanent maxillary incisors. Morphology of the permanent mandibular incisors. Morphology of the permanent canines. Morphology of the permanent mandibular premolars. Morphology of the permanent maxillary premolars. Biologic considerations of tooth structures. Occlusion. Morphology of the permanent mandibular molars. Morphology of the permanent maxillary molars. Periodontal correlations and root anatomy. Morphology of the deciduous teeth.

DAT 303: Dental Anatomy Practicals (4 Units C: PH 180)

Learning Outcomes

At the end of this course, students should be able to:

1. demonstrate the knowledge about ideal morphology of mandibular molar teeth;
2. create the ideal dental anatomy of permanent mandibular molar by waxing and carving;
3. recreate appropriate anatomical features in wax in a laboratory session and demonstrate subsequently, competency in performing such exercises; and
4. self-evaluate waxed teeth by using the self-assessment rubric and compare software.

Course Contents

Develop the knowledge about using waxing instruments in the correct manner. Create different structures with dental wax to develop psychomotor skills. Create the ideal dental anatomy of a permanent anterior tooth by subtractive manner using soap carving technique. Develop the skills to critically self-evaluate waxed teeth by using the self-assessment rubric and compare software.

GST 312: Peace and Conflict Resolution (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. analyse the concepts of peace, conflict, and security;
2. list major forms, types and root causes of conflict and violence;
3. differentiate between conflict and terrorism;
4. enumerate security and peace building strategies; and
5. describe roles of international organisations, media and traditional institutions in peace building.

Course Contents

Concepts of Peace. Conflict and security in a multi-ethnic nation. Types and theories of conflicts, ethnic, religious, economic, geo-political conflicts. Structural conflict theory, realist theory of conflict, frustration-aggression conflict theory. Root causes of conflict and violence in Africa, indigene and settlers Phenomenon. Boundaries/boarder disputes. Political disputes. Ethnic disputes and rivalries. Economic inequalities. Social disputes. Nationalist movements and agitations. Selected conflict case studies. Tiv-Junkun, Zango Kartaf, chieftaincy and land disputes. Peace building. Management of conflicts and security. Peace and human development. Approaches to peace and conflict management (religious, government, community leaders). Elements of peace studies and conflict resolution. Conflict dynamics assessment scales. Constructive and destructive. Justice and legal framework. Concepts of social justice. The Nigeria legal system. Insurgency and terrorism, peace mediation and peace keeping. Peace and security council (international, national and local levels). Agents of conflict resolution, conventions, treaties, community policing. Evolution and imperatives. Alternative dispute resolution (ADR). Dialogue, arbitration, negotiation and collaboration. Roles of international organizations in conflict resolution, the United Nations, (UN) and its conflict resolution organs, the African union and peace security council, ECOWAS in peace keeping. Media and traditional institutions in peace building. Managing post-conflict situations, crisis. Refugees, internally displaced persons, IDPs. The role of NGOs in post-conflict situations, crisis.

ENT 312: Venture Creation (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the key steps in venture creation;
2. identify opportunities in problems and in high potential sectors regardless of geographical location;
3. state how original products, ideas, and concepts are developed;
4. develop business concept for further incubation or pitching for funding;
5. identify key sources of entrepreneurial finance;
6. implement the requirements for establishing and managing micro and small enterprises;
7. conduct entrepreneurial marketing and e-commerce;
8. apply a wide variety of emerging technological solutions to entrepreneurship; and
9. appreciate why ventures fail due to lack of planning and poor implementation.

Course Contents

Opportunity identification (sources of business opportunities in Nigeria, environmental scanning, demand and supply gap/unmet needs/market gaps/market research, unutilised resources, social and climate conditions and technology adoption gap). New business development (business planning, market research). Entrepreneurial finance (venture capital, equity finance, Micro finance, Personal savings, small business investment organizations and business plan competition). Entrepreneurial marketing and e-commerce (principles of marketing, customer acquisition and retention, B2B, C2C and B2C models of e-commerce, first mover advantage, E-commerce business models and successful E-commerce companies,). Small business management/family business. Leadership and management, basic book keeping, nature of family business and family business growth model. Negotiation and business communication (strategy and tactics of negotiation, bargaining, traditional and modern business communication methods). Opportunity discovery demonstrations (business idea generation presentations, business idea contest, brainstorming sessions, idea pitching), technological solutions (the concept of market/customer solution, customer solution and emerging technologies, business applications of new technologies. Artificial intelligence (AI). Virtual/mixed reality (VR). Internet of things (IoTs). Blockchain. Cloud computing. Renewable energy. Digital Business and e-commerce strategies).

PAT 302: General Pathology I (4 Units C: LH 60)

Learning Outcomes

At the end of this course, students should be able to:

1. define pathology;
2. enumerate the aetiologic factors of disease;
3. list causes and mechanism of cell injury including free radical injury, cell death and apoptosis;
4. describe the adaptations of cell growth and differentiation, hypertrophy, hyperplasia, metaplasia and atrophy;
5. explain the processes of cutaneous wound healing and repair;
6. describe cell cycle and define acute inflammation;
7. discuss causes of inflammation, vascular and cellular events in acute inflammation;
8. explain mediators of acute inflammation, vaso-active amines, plasma derived, serous/fibrinous inflammation;
9. explain outcome of inflammation;
10. describe chronic inflammation, granulomatous inflammation;
11. discuss systemic effects of inflammation; and

12. state consequences of deficient/excess inflammation.

Course Contents
Introduction, basic definitions, aetiology of disease. Cell injury, cellular adaptation, cell death (necrosis and apoptosis). Free radicals. Ischemic cell injury. Cutaneous wound healing and repair. Inflammation, definition and causes of acute inflammation. Vascular and cellular events in acute inflammation. Mediators of acute inflammation (vaso-active amines, plasma derived). Serous/fibrinous inflammation, chronic inflammation, granulomatous inflammation. Systemic effects of inflammation. Consequences of deficient/excess inflammation. Genetic disorders, classification (chromosomal, single gene and multifactorial). Chromosomal disorders (Down, Turner, Klinefelter, Edwards syndromes). Single gene disorders (classic and non classic). Mutations and multifactorial disorders. Congenital anomalies, types, aetiology. Teratogenesis.

PAT 304: General Pathology II (4 Units C: LH 60)

Learning Outcomes
At the end of this course, students should be able to:
1. describe innate and adaptive immunity;
2. outline components of immune system;
3. define types of hypersensitivity disorders;
4. define the role of MHC in disease;
5. explain various mechanisms of tolerance and autoimmunity;
6. describe primary immunodeficiency;
7. discuss the pathology of HIV/AIDS and amyloidosis;
8. define oedema, embolism, thrombosis and shock;
9. explain pathophysiologic mechanisms and pathogenesis underlying oedema, embolism, thrombosis and shock;
10. enumerate morphologic and clinical features of oedema, embolism, thrombosis, shock;
11. define types of pathologic calcification;
12. explain fatty change and cellular accumulations of protein, glycogen and pigments; and
13. describe management of infectious diseases.

Course Contents
Immunopathology. Innate and adaptive immunity. Components of immune system (cells, tissues and molecules). Hypersensitivity disorders. Major histocompatibility complex. Mechanism of tolerance. Autoimmunity. Primary immunodeficiencies. AIDS. Amyloidosis.
Haemodynamic disorders. Oedema. Embolism. Thrombosis. Shock. Neoplasia. Definition, benign/malignant tumours. Tumour nomenclature, aetiology of tumours. Genes involved in neoplastic process. Familial syndromes. Chemical, radiation and microbial carcinogenesis. Tumour immunity. Effect of tumour on host. Paraneoplastic syndromes. Intracellular accumulations. Pathologic calcification. Intracellular accumulations of protein. Lipids, glycogen and pigments. Infectious diseases. Malaria. Tuberculosis. Leprosy. Schistosomiasis. Syphilis. Amoebiasis. Typhoid. Onchocerciasis.

PAT 306: Pathology practical I (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. apply autopsy-indications, types and procedure;
2. identify museum pots and describe museum pots;
3. diagnose museum pots; and

4. apply histopathology-tissue processing, use of microscope, identification and diagnosis of common lesions.

Course Contents
Identification, description and diagnoses of museum specimens. Microscopy, histology slide-interpretation. Description and diagnoses of selected diseases. Tissue processing. Museum techniques. Post-mortem.

PCL 302: Introductory Pharmacology (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. illustrate the history of pharmacology;
2. outline branches of pharmacology and their relevance to health professions and the drug industry;
3. enumerate sources of obtaining drug information and the origins of drugs;
4. list the various routes of drug administration, biological membranes crosses and transport mechanisms involved;
5. outline the components of pharmacokinetics and their influencing factors;
6. describe body compartments and their fluid volumes and drug binding sites;
7. explain the liver microsomal mixed function oxidase system, its phases and types of reactions and how drugs can induce/inhibit their activity;
8. outline the major routes of drug elimination and termination effects;
9. explain what first-pass effect is and mode of drug action;
10. discuss dose-effect relation of drugs including effects of the different ligand types and measurements of therapeutic index;
11. describe adverse drug reactions, dose-related, acute and chronic overdosage;
12. illustrate drug abuse and dependence, and the central mechanism of action of major drugs of abuse;
13. enumerate the signs and symptoms of overdose and withdrawal effects of major drugs of abuse, alcohol, opioids and benzodiazepines; and
14. explain the pharmacotherapeutic options and their relative benefits/ side effects.

Course Contents
Definition, historical concepts and the development of modern pharmacology, therapeutics, clinical pharmacology and toxicology. Pharmacology in relation to the health professions. Medicine, pharmacy, dentistry, nursing. The role of pharmacology in the drug industry. Drug development, evaluation and control. Role of pharmacology in public health, social and preventive medicine. Information source. How to search for drug information, use of reference and cross–reference, book index, journals, list of useful reference books. Origin/source of drugs. Routes of administration of drugs. Biological membranes and transport of drugs, drug-body interaction. Pharmacokinetics, absorption, distribution, metabolism and elimination of drugs. Absorption and influencing factors. Drug distribution in the body compartment and fluid volumes, binding to plasma proteins, tissues and organs; passage into the CNS, passage across placenta. Biotransformation. Chemical pathways of drug metabolism, sites of biotransformation, liver microsomal mixed function oxidase system, Phase I and Phase II reactions, types of phases I, types of phase II reactions (glucuronidation, acetylation, glycine conjugation), inhibition, depression and induction of enzymes. Major routes of drug elimination and termination of effects (renal, biliary and faecal excretion), other minor routes (lungs, skin). Rates of drug absorption and elimination, measurements of clearance and apparent volume of distribution, factors influencing clearance and distribution, bioavailability, half-life, first pass effect. Use of pharmacokinetics in designing dosage regimes. Loading dose,

maintenance dose. Clinical relevance of drug metabolism. Individual differences, drug-drug interactions, interaction between drugs and endogenous compounds. Factors affecting pharmacokinetics processes, disease, feeding status, age, sex. Pharmacodynamics. Mode of action of drugs. Molecular mechanism of drug action, drug receptor interactions, drugs acting on enzyme systems, non-specific interaction of drugs with living systems. Dose-effect relation of drugs. Dose-response curve, concentration-effect curve, potency, efficacy, therapeutic index, biological assay, effective dose (ED50), toxic dose (LD50), lethal dose (LD50), receptor binding of agonists and antagonists, competitive and non-competitive antagonists, partial agonist, receptor-effector coupling, spare receptors, other antagonism, chemical and physiological. Variability in individual response. Idiosyncrasy, pharmacogenetics, hypo-and hyper-reactivity, hypersensitivity, tolerance, tachyphylaxis. Adverse drug reactions, dose-related drug toxicity, acute and chronic over dosage. Drug dependence and addiction, underlying biological basis of addiction as a disease, differential diagnostic criteria for drug abuse vs. dependence and their differences, mechanism of action within the CNS of major drugs of abuse. Signs and symptoms of overdose caused by major drugs of abuse (including alcohol, opioids and benzodiazepines), signs and symptoms of opioid withdrawal, pharmacotherapeutic options for treatment of opioid abuse and dependence and their relative benefits and side effects; pharmacotherapeutic options for treatment of alcohol abuse and their relative benefits and side effects. Drug discovery and clinical trials, phases of clinical trials. Differences between single and double-blind designs for clinical trials. Definition of IND and NDA. Ways in which a clinical drug study is evaluated.

PCL 304: Autonomic Pharmacology (3 Units C: LH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe the anatomy of the ANS and its two divisions;
2. outline the major neurotransmitters involved in each division of the ANS, synthesis of the neurotransmitters;
3. list sympathetic and parasympathetic effects;
4. describe the physiological and pathophysiological role of 5HT and histamine;
5. outline the mechanism of release of 5HT and histamine;
6. explain the various types and subtypes of receptors, with examples of antagonists;
7. discuss basic and clinical pharmacology of antagonists at the 5HT-and histamine receptors;
8. describe other autacoids;
9. list the various modes of action of drugs and explain dose-effect relation of drugs; and
10. explain concept of variability in individual response to drugs.

Course Contents

Review of autonomic nervous system anatomy, sympathetic (thoracolumbar) and parasympathetic (craniosacral) divisions. Review of neurohumoral transmission. Neurotransmitters of the ANS, cholinergic and adrenergic transmission–evidence for acetylcholine and noradrenaline, synthesis of the neurotransmitters. Parasympathetic system, cholinergic receptors, muscarinic and nicotinic stimulants, uses, pharmacodynamics, SAR, organ system effects. Indirectly acting cholinergic stimulants-anticholinesterases, chemistry and pharmacokinetics. Clinical pharmacology of cholinergic stimulants. Cholinergic receptor antagonists–muscarinic and nicotinic, chemistry, pharmacokinetics and pharmacodynamics of atropine and related drugs, organ system effects (CNS, eye, CVS, respiratory system, GIT, Genito–urinary tract and sweat glands), including their clinical pharmacology. Basic and clinical pharmacology of ganglion blockers. Somatic motor nerves. Neuromuscular junction transmission, effect of drugs, end–plate nicotinic receptor and neuromuscular blockers, types of blockers and their interaction with anti-cholinesterase, lack of Pseudo-cholinesterase and

anaesthesia. Sympathetic system, basic pharmacology of adrenergic receptor stimulants. Identification of adrenergic receptors, molecular mechanisms of adrenergic action, chemistry, pharmacokinetics and pharmacodynamics of sympathomimetic drugs. Organ system effects. CVS, blood vessels, heart, blood pressure, eye, respiratory tract, exocrine glands, metabolic effects on endocrine function (use of noradrenaline, adrenaline, isoprenaline dopamine, dobutamine, salbutamol, fenoterol, terbutaline, phenylephrine, ephedrine and amphetamine as examples). Direct and indirect acting sympathomimetics such as tyramine. Clinical pharmacology of adrenergic receptor acting drugs. Cardiovascular application, condition in which blood flow or blood pressure is to be enhanced, hypotension, shock, carcinogenic shock, condition in which the blood flow is to be reduced, hypertension, and cardiac applications, paroxysmal atrial tachycardia, complete heart block and cardiac arrest, congestive heart failure. Respiratory application, Bronchitis, bronchial asthma. Anaphylaxis, Ophthalmic, genitourinary, use of β2 antagonists (terbutaline, ritodrine, salbutamol) to suppress premature labour. CNS applications Toxicity of sympathomimetics. Adrenergic receptor blocking drugs - Alpha receptor blockers, types (reversible and irreversible), receptor–selective antagonists (phenoxybenzamine, phentolamine, yohimbine, prazosin, indoramin, idazoxan), pharmacological effects (cardiovascular and others), Beta-receptor blockers, types, B1- and B2-specificity (propranolol, metoprolol, timolol, atenolol, pindolol, labetalol), pharmacokinetics, (absorption, bioavailability, distribution and clearance), pharmacodynamics (CVS, respiratory tract, eyes, metabolic and endocrine effects), effects unrelated to beta receptor blockade. Clinical pharmacology of alpha- and beta-receptor blockers. Application of alpha-blockers, phaeochromocytoma, hypertensive emergencies and hypertensive chronic treatment, peripheral vascular disease and local vasoconstrictor excess. Application of beta-blockers, hypertension, ischaemic heart disease, cardiac arrhythmias, other cardiovascular disorders, glaucoma, hyperthyroidism, neurological disease (migraine headache, tremors, anxiety, alcohol withdrawal), choice of beta blockers, clinical toxicity. Autacoids, Histamine and its antagonists. Physiological and pathophysiological role of histamine, pharmacology of histamine receptors, mechanism of histamine release, H1-antagonists (ethanolamine, ethylenediamines, phenothiazines), H2-antagonists (burimamide, metiamide, cimetidine.), H3-antagonists (bronchioles, methylhistamine), basic pharmacology, chemistry, pharmacokinetics and pharmacodynamics, clinical pharmacology. 5HT and its antagonists. Methysergide. Cyproheptadine, cyclooxygenase inhibitors, vasoactive polypeptides, vasopressin, angiotensin, kinins, kallikrein, substance P, prostaglandins, leukotrienes, cyclic nucleotides and other mediators.

PCL 306: Cardiovascular Pharmacology (3 Units C: LH 30; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. describe electrophysiology of normal cardiac rhythms and mechanism of arrhythmias;
2. enumerate the classes of drugs used in management, with specific drug examples;
3. list basic and clinical pharmacology of drugs used in management;
4. explain pathophysiology of HTN, therapeutic implications and diagnosis;
5. list the basic and clinical pharmacology of the various classes of antihypertensive agents; and
6. describe specific examples of each class of antihypertensive agent.

Course Contents

Hypertension and blood pressure regulation. Aetiology of hypertension. Normal regulation of blood pressure. Postural baroreflex. Renal response to decreased blood pressure, therapeutic implications, diagnosis. Basic pharmacology of antihypertensive drugs in relation to mechanism and site of action, haemodynamic effects, dosage, pharmacokinetics and toxicity,

diuretics, sympatholytic drugs, direct vasodilator, and drugs that block production or action of angiotensin. Angina pectoris and anti-anginal Drugs. Pathophysiology of angina, determinants of coronary blood flow and myocardial oxygen supply, specific therapeutic interventions (nitrates, beta blockers, calcium entry blockers). Basic and Clinical pharmacology of anti-anginal drugs. Historical concepts, chemistry, pharmacokinetics, pharmacodynamics, toxicity and tachyphylaxis. Congestive heart failure and Drugs used in Management, pathophysiology of heart failure, pathophysiology of cardiac performance, pathophysiology of the peripheral vasculature in congestive heart failure. Basic and clinical pharmacology of drugs used in congestive heart failure (cardiac glycosides and others like amrinone and beta-adrenergic stimulants), Administration, dosage, interactions, other clinical uses, toxicity, chemistry, pharmacokinetics, pharmacodynamics (mechanical and electrical effects). Cardiac arrhythmias and anti-arrhythmic drugs, electrophysiology of normal cardiac rhythm, mechanisms of arrhythmias. Basic and clinical pharmacology of anti-arrhythmic drugs, classes and types, mechanism of action, specific drugs, pharmacokinetics, pharmacodynamics and extracardiac effects, principles of anti-arrhythmia. Diuretics, renal tubule transport mechanism. Proximal and distal tubules, loop of Henle and collecting ducts. Basic and clinical pharmacology-types (carbonic anhydrase inhibitors, thiazides, loop diuretics, potassium-sparing (aldosterone antagonist), chemistry, pharmacokinetics, pharmacodynamics, clinical indications, dosage, toxicity, contraindications, combination therapy. Drugs that affect water excretion. Mannitol. Clinical pharmacology of diuretics - Oedematous state (CHF, hepatic cirrhosis, nephritic syndrome) non-oedematous states (hypertension, renal potassium wasting), alteration of urinary pH, tract infections, renal failure immunity, immunosuppressive drugs. Drugs used in hyperlipidaemic conditions, Pathophysiology of hyperlipoproteinemia, Normal lipoprotein metabolism review, the hyperlipoproteinemic states (primary hypertriglyceridemia, primary hypercholesterolaemia; deficiency of high-density lipoproteins, secondary hyperlipoproteinemia). Role of elevated serum LDL concentrations in promoting risk of developing cardiovascular disease, protective role of increased serum HDL concentration in decreasing risk, presently accepted values for desirable LDL, HDL and triglyceride concentrations in normal individuals, treatment goals for individuals with hyperlipidaemia. Role of diet and lifestyle, pharmacology of specific drugs used (nicotinic acid, clofibrate, gemfrozil, bile acid-binding resins, sitosterols, neomycin, HMG-CoA reductase inhibitors, dextrothyroxine, probucol), drug combinations. Drugs Acting on blood. Cytopenia and Drugs used in treatment anaemias. Iron deficiency and other hypochromic anaemias, megaloblastic anaemia, basic pharmacology of drugs used in management, iron, cobalamins (B12), folates. Basic pharmacology, clinical indication, mechanism of action, adverse effects and contraindications of the growth factors used in management of cytopenia, including, erythropoietin, G-CSF, GM-CSF and IL-II. thrombosis and thrombolytics, principles of blood coagulation, plasma coagulation factors, regulation of coagulation and fibrinolysis. Basic pharmacology of drugs used to treat thrombosis, types of anti-coagulants (heparin and low molecular weight heparins, coumarins, indandiones), chemistry, pharmacokinetics, mechanism of action, administration and dosage, role of aPTT in heparin monitoring, concept of using INR in management of warfarin therapy. Platelet aggregation inhibitors, drugs that inhibit platelet function, aspirin and related cyclooxygenase inhibitors, imidazole, sulphinpyrazone. Drugs used in bleeding disorders. Vitamin K. Factor VIII. Factor IX. Fibrinogen. Fibrinolysis inhibitors (aminocaproic acid, tranexamic acid).

MIC 302: Introductory Microbiology and General Bacteriology (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. identify and differentiate various organisms of medical importance;

2. describe the different levels of interaction between the host, environment and pathogens;
3. define normal body flora and roles in health and disease;
4. discuss collection, transportation and processing of clinical specimens;
5. describe the pathogenesis and clinical manifestations of infectious agents;
6. apply the knowledge of medical microbiology in management of patients; and
7. control infections in the hospital and community.

Course Contents
Infectious disease, past and present. Mode of transmission of infectious disease. Nature and classification of bacteria of medical importance. Mechanisms of pathogenicity and virulence. Microbial metabolism and multiplication. Specification defence mechanisms against bacteria. Exotoxin-producing bacteria. The process of bacterial destruction (sterilisation and disinfection). The normal flora of the human body. Description and identification of the following organism, Salmonella typhii, Shigella spp, Mycobacterium spp, Brucella spp, Corynebacterium spp, Clostridium spp, Spirochaetes, Listeria, Yersinia spp, Vibrios, Campylobacterium spp, Enterobacterium, Actinobacterium spp, Pseudomonas spp, Actinomyces and Nocardia Chlamydia, Mycoplasma and Rickettsia spp.

MIC 304: General Parasitology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define taxonomy of parasites;
2. outline historical development of medical protozoology;
3. describe development of medical helminthology;
4. classify Helminthes; and
5. explain general properties of Helminthes.

Course Contents
Taxonomy of parasites. Historical development of medical protozoology. Development of medical helminthology. Classification of Helminthes. General properties of Helminthes.

MIC 306: General Virology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list basic properties of viruses;
2. classify viruses;
3. discuss development and cultivation of medically important viruses; and
4. describe host immune response against viruses.

Course Contents
Basic properties and classification of viruses. Development and cultivation of medically important viruses. Host immune response against viruses.

MIC 308: General Mycology (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define mycology;
2. explain medical mycology;
3. describe the nature of medically important fungi;

4. classify medically important fungi; and
5. discuss mode of reproduction of fungi.

Course Contents
Introduction to medical mycology. Nature and classification of medically important fungi. Mode of reproduction of fungi.

CPY 302: Introduction to Chemical Pathology (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain biological variability and the effects of patient preparation prior to sample collection in order to enable students send suitable samples to the laboratory;
2. describe sample collection, random samples, timed collection, and use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples;
3. interpret clinical chemistry results, use of conversion factors for different units and reference intervals;
4. describe acid base homeostasis and disorders, sodium and water homeostasis and disorders, potassium homeostasis and disorders, calcium homeostasis and related disorders, uric acid metabolism and disorders;
5. enumerate potassium balance and disorders; and
6. list calcium, phosphate, magnesium and vitamin D disorders.

Course Contents
General clinical chemistry. General introduction to chemical pathology, branches of chemical pathology, the role of chemical pathology in the diagnosis, monitoring, detection of complication and determination of diseases, burden of non-communicable diseases, importance of reference interval/range, Gaussian distribution, normal distribution curve. Specimen handling and pre-analytical variables. Biological variability. Concept of diurnal rhythm, supracardian rhythm, modifiable and non-modifiable causes of analytical variability, and types of specimen collected and analysed by the chemical pathology laboratory. Patient preparation for chemical pathology investigations, random samples, timed collection, and use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples. Interpretation of numerical results. Units in clinical chemistry, SI and conventional units, interpreting clinical chemistry result, use of population specific reference interval, subject base reference interval, significant differences in results, sensitivity, specificity, diagnostic efficiency and odd's ratio, negative and positive predictive values, handling and abnormal or incongruent laboratory result. Acid base homeostasis and disorders, sodium and water homeostasis and disorders, potassium homeostasis and disorders, calcium homeostasis and related disorders, uric acid metabolism and disorders. Water and sodium homeostasis and disorders. Potassium balance and disorders. Calcium, phosphate, magnesium and vitamin D disorders.

CPY 304: Immunology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define basic concepts in immunology;
2. describe immunology of common infectious diseases;
3. list hypersensitivity reactions;
4. describe autoimmune diseases; and

5. list immunodeficiency conditions.

Course Contents
Basic concepts in immunology. Immunology of common infectious diseases (Malaria, TB, HIV). Hypersensitivity reactions. Autoimmune diseases. Immunodeficiency states.

CPY 306: Clinical Chemistry of Disease I (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. interpret clinical chemistry results;
2. illustrate use of conversion factors for different units and reference intervals;
3. describe the application of conversion factors for different units and reference intervals;
4. explain sample collection, random samples, timed collection; and
5. discuss use of special investigations requests, specimen/sample containers, difference between plasma, serum and whole blood, handling of CSF samples.

Course Contents
Blood glucose homeostasis. Glucose tolerance tests, performance and interpretation, diabetes mellitus. Formation of free fatty acid, ketone bodies and lactate. Plasma lipids, cholesterol, triglycerides, phospholipids and non-esterified fatty acids. Plasma lipoproteins and causes of hyper and hypolipoproteinaemia. Concept of risk factors for diseases and significance in prevention. Plasma proteins, reference values, separation of fractions and variations in health and disease. Paraproteinaemias. Bence-Jones proteinuria and significance. Renal function, dysfunction and investigations. Definitions, causes and consequences of azotaemia, uraemia, creatinine clearance. Liver function, dysfunction and investigations. Biochemical assessment of hepatic function, jaundice, hepatocellular, haemolytic and obstructive.

HAE 302: General Haematology I (4 Units C: LH 30; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. define haematology;
2. describe the general concept, organisation and various stages of blood cell formation;
3. list the types and roles of growth factors involved in haematopoiesis;
4. explain the mechanism of control of haemoglobin synthesis;
5. enumerate the sites of haematopoiesis and types of haemoglobins produced in both prenatal and post-natal life;
6. state the regulation and stages of haematopoiesis;
7. describe the normal ranges of routine haematological parameters;
8. describe red blood cell indices and their correlation with red cell morphology;
9. classify anaemias and give differential diagnoses based on morphology and red cell indices;
10. explain leucocytosis/leucopenia and thrombocytosis/thrombocytopenia and their causes and mechanisms;
11. illustrate how to evaluate patients coming with quantitative blood abnormalities;
12. list common red cell shape, size and inclusion abnormalities;
13. describe various white blood cell nuclear and inclusion abnormalities;
14. enumerate platelet size and functional abnormalities;
15. discuss various clinical conditions associated with qualitative blood cell abnormalities;
16. list common causes of lymphadenopathy and splenomegaly;
17. differentiate and clinically evaluate patients with lymphadenopathy and splenomegaly; and

18. demonstrate knowledge of hyposplenism.

Course Contents
Blood cell formation and regulation. Erythropoiesis, myelopoiesis, lymphopoiesis and thrombopoiesis. Growth factors in haematopoiesis. Genetic control of haemoglobin synthesis. Sites of haematopoiesis in the foetus and in adult life. Types of prenatal and postnatal haemoglobins. Normal haematological values, red cell count, Hb concentration, Haematocrit. Red cell indices. MCV, MCH, MCHC, correlation with red cell morphology/ morphological classification of anaemia. White cell count, differentials and absolute counts, platelet count. Quantitative blood cell abnormalities, anaemia vs polycythaemia, causes/mechanism/clinical/evaluation. Leucocytosis/leucopaenia causes/mechanism/clinical evaluation. Thrombocytosis Vs thrombocytopaenia, causes/ mechanism/clinical evaluation. Qualitative blood cell Abnormalities. Revise normal structure and functions of red blood cells, leucocytes and platelets. Red cell shape abnormalities. Red cell size abnormalities. Red cell inclusions. White cell nuclear abnormalities. White cell cytoplasmic inclusions and abnormalities. Platelet size abnormalities. Lymphadenopathy-causes/characterization/clinical evaluation. Splenomegaly, hypersplenism, hyperreactive, malarial, splenomegaly, causes, characterisation, clinical evaluation. Hyposplenism and splenectomy. Causes, characterisation, clinical, evaluation. Causes of functional asplenia/hyposplenism and surgical splenectomy. Precautions and treatment.

400 Level

PAT 401: Systemic Pathology I (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of hypertension, atherosclerosis, ischemic heart disease (angina pectoris, myocardial infarction), valvular heart disease, cardiomyopathies, congenital heart disease, pericarditis, heart failure, hypertensive heart disease, cardiac tumours;
2. explain epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of COLDs, restrictive lung disease (pneumoconiosis, hypersensitivity pneumonitis, sarcoidosis, idiopathic pulmonary fibrosis), pneumonia, PTB, respiratory distress syndromes (neonatal/adult), pulmonary embolism and hypertension, respiratory failure, lung tumours, upper respiratory infections (common cold, pharyngitis, croup, epiglottitis, otitis media); and
3. discuss epidemiology, aetiopathogenesis, morphology, clinical features, investigation, prognosis and management of retinoblastoma, neuroblastoma, nephroblastoma, medulloblastoma, Burkitt's lymphoma, embryonal rhabdomyosarcoma.

Course Contents
Cardiovascular system. Hypertension. Atherosclerosis. Ischaemic heart disease. Hypertensive heart disease. Valvular heart disease. Heart failure. Cardiomyopathies. Congenital heart disease. Pericarditis. Cardiac tumours. Lymphoreticular system. Acute and chronic lymphadenitis. Lymphoid hyperplasia. Lymphomas. Hyperimmune. Malaria. Splenomegaly syndrome. Other causes of splenomegaly. Respiratory System. COLDs. Restrictive lung disease (pneumoconiosis, hypersensitivity pneumonitis, sarcoidosis, idiopathic pulmonary fibrosis). Tuberculosis. Pneumonia. Respiratory distress syndromes (neonatal/adult). Pulmonary embolism. Pulmonary hypertension. Respiratory failure. Lung tumours. Upper respiratory infections (common cold, pharyngitis, croup, epiglottitis, otitis media). Childhood

malignancies. Retinoblastoma. Neuroblastoma. Nephroblastoma. Medulloblastoma, Burkitt's lymphoma. Embryonal rhabdomyosarcoma. GIT system. Oral cancer. Dental caries. Sialoadenitis. Salivary gland tumours. Tracheo-oesophageal fistula. Achalasia cardia. Hiatus Hernia. Oesophagitis. Oesophageal cancer. Gastritis. Peptic ulcer. Hypertrophic gastropathy. Gastric cancer. Malabsorption. Inflammatory bowel disease. Hirschprung disease. Appendicitis. Intestinal polyps. Colorectal cancer. Hepatobiliary/Pancreas. Hepatitis, yellow fever. Lassa fever. Alcoholic liver disease. Metabolic liver disease. Cirrhosis. Liver tumours. Primary biliary cirrhosis. Sclerosing cholangitis. Cholelithiasis. Cholecystitis. Pancreatitis. Pancreatic tumours. Endocrine System. Diabetes mellitus. Islet tumours of the pancreas. Hyperthyroidism. Hypothyroidism. Thyroiditis. Thyroid tumours. Multiple endocrine neoplasia (MEN). Pituitary and adrenal disorders.

PAT 403: Pathology Practical II (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. apply autopsy-indications, types and procedure;
2. identify museum pots;
3. describe museum pots;
4. diagnose museum pots; and
5. apply histopathology-tissue processing, use of microscope, identification and diagnosis of common lesions.

Course Contents

Identification. Description and diagnoses of museum specimens. Microscopy. Histology slide-interpretation. Description and diagnoses of selected diseases. Tissue processing. Museum techniques. Post-mortem.

PCL 401: GIT Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe pathophysiology of nausea and vomiting;
2. explain the basic and clinical pharmacology of the different classes of antiemetics, with specific examples;
3. list the common causes of constipation;
4. explain the basic pharmacology of drugs used to provide relief of constipation;
5. enumerate non-specific antidiarrhoeal drugs, lactulose;
6. describe pathophysiology of peptic ulcer disease;
7. list drugs that control gastric acid secretion and treat peptic ulcers;
8. list drugs to treat inflammatory bowel disease; and
9. enumerate anti-IBD therapies.

Course Contents

Drugs acting on the alimentary system, nausea and vomiting, pathophysiology, basic pharmacology of antiemetics, dopamine-receptor antagonists (metoclopramide, prochlorperazine, haloperidol). Antihistamines, serotonin antagonists, anticholinergics, benzodiazepines, corticosteroids. Constipation, common causes, basic pharmacology of drugs used for relief (bulk, osmotic and stimulant laxatives, saline and magnesium laxatives, detergent laxatives, non-absorbable sugars, polyethylene glycol, lubricants, enemas). Non-specific antidiarrhoeal drugs. Lactulose ulcer healing drugs. Drug management. H2-receptor antagonists. Antacids. Proton-pump inhibitors. Triple therapy.

PCL 403: Respiratory Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. define the pathophysiology and types of asthma;
2. enumerate the various classes of anti-asthmatics, with specific examples;
3. explain the basic pharmacology of the classes of drugs;
4. discuss the clinical pharmacology of the drugs with regards to rapidity of onset of actions and preference of certain drugs in certain situations;
5. distinguish which drug classes are bronchodilators and which are anti-inflammatory;
6. explain the use of oxygen therapy in management of asthma;
7. list advantages of inhalational therapy in management of asthma;
8. describe the cough reflex, the common causes of cough and the types of coughs;
9. discuss the classes of drugs used in management of cough, with examples; and
10. explain the basic pharmacology of drugs used in management of cough.

Course Contents

Drugs acting on the respiratory system. Asthma and anti-asthmatics. Pathophysiology. Types (chronic asthma, status asthmaticus), classes of anti-asthmatics (B2-adrenergic agonists, methylxanthines, muscarinic receptor antagonists, adrenal corticosteroids, cromolyn, leukotriene modulators, monoclonal antibodies). Basic pharmacology of anti-asthmatic drugs. bronchodilator drugs and anti-inflammatory drugs. Oxygen therapy. Advantages of inhalational therapy in management of asthma. Mechanism of action, adverse effects, contraindications, pharmacokinetics, rapidity of onset of actions, preference of certain drugs in certain situations bronchodilator drugs. Drug-induced pulmonary disorders. Cough. Antitussives. Expectorants. Mucolytics. Respiratory stimulants.

PCL 405: Clinical Pharmacology and Therapeutics (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. define ADR, types, classes inherent and acquired anomalies;
2. describe the basic mechanisms and consequences of drug-drug interactions;
3. define the approaches to treatment of ADRs;
4. explain clinical importance of ADRs in relation to embryonic and foetal pharmacology;
5. enumerate drugs that cause teratogenic effects;
6. explain the concept of altered drug response in infants and children, and influence on paediatric drug dosing; and
7. discuss the concept of altered drug response in the elderly, and influence on geriatric drug dosing.

Course Contents

Clinical pharmacology general aspect. Evaluation of drug therapy, clinical aspects of adverse drug reaction (inherent anomalies, acquired anomalies, treatment of adverse reactions). Basic mechanisms of drug-drug interactions. Consequences of drug-drug interactions. Clinically important drug interactions, beneficial embryonic and foetal clinical pharmacology, drug use in pregnancy, teratogenicity. Paediatric clinical pharmacology and therapeutics. Altered drug response in infants and response in infants and children, drug dosage in paediatrics. Geriatric clinical pharmacology and therapeutics. Altered drug response in the elderly drug dosage in geriatrics.

MIC 401: Medical Bacteriology (1 Unit C: PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. identify basic safety procedures in the microbiology laboratory;
2. demonstrate staining techniques and use of light microscope;
3. discuss sterilisation and disinfection techniques;
4. explain cultivation of micro-organisms;
5. demonstrate biochemicals testing;
6. conduct slide agglutination tests; and
7. demonstrate sensitivity testing.

Course Contents
Practical bacteriology. Basic safety procedures in the microbiology laboratory. Staining techniques. Gram's reaction, Ziehl-Nielsen reaction and spore staining reaction. Use of light microscope. Sterilisation and disinfection techniques. Cultivation of micro-organisms. Biochemicals testing. Slide agglutination tests. Sensitivity testing.

MIC 403: Medical Mycology (1 Unit; C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define superficial infections;
2. describe subcutaneous infections;
3. define cutaneous infections;
4. explain systemic infections;
5. describe opportunistic infections;
6. demonstrate skin scrapings for the diagnosis of superficial dermatomycoses;
7. identify fungal morphology in microscopy and on Sabourauds agar;
8. conduct rapid diagnostic tests; and
9. explain molecular diagnosis, PCR, ELISA.

Course Contents
Fungal infections, superficial, subcutaneous, cutaneous, systemic, opportunistic. Practical mycology, skin scrapings for the diagnosis of superficial dermatomycoses. Fungal morphology in microscopy and on Sabourauds agar. Rapid diagnostic tests. Molecular diagnosis, PCR, ELISA.

MIC 405: Medical Parasitology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe soil associated parasitic infections;
2. explain vector transmitted protozoan infections;
3. describe vector transmitted flavid nematode infections;
4. discuss animal associated parasitic infections, zoonoses;
5. enumerate environmental factors influencing transmission of parasitic infections;
6. explain nutrition and parasitic infections;
7. identify principles of control of parasitic infections;
8. demonstrate indirect diagnostic techniques for parasitic infections; and
9. explain molecular aspects of medical parasitology.

Course Contents
Soil associated parasitic infections. Vector transmitted protozoan infections. Vector transmitted flavid nematode infections. Animal associated parasitic infections (zoonoses). Environmental factors influencing transmission of parasitic infections. Nutrition and parasitic infections. Principles of control of parasitic infections. Indirect diagnostic techniques for parasitic infections. Introduction to molecular aspects of medical parasitology.

MIC 407: Applied Medical Microbiology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define encephalitis, meningitis, tetanus;
2. describe mumps, TB, pneumonia, pertussis;
3. differentiate gastroenteritis and food poisoning;
4. explain sexually transmitted disease and urinary tract infection, P. I .D;
5. describe infective endocarditis, rheumatic heart disease and pyoderma, cellulitis and myiasis, leprosy;
6. explain osteomyelitis, abscess, wound infections and pyomyositis, conjunctivitis;
7. enumerate principles of antibiotic and chemotherapy, modes of bacterial resistances to antibiotics, viral vaccines, prophylactic immunisation;
8. define pyrexia of unknown origin (PUO) and describe bacteria/septicaemia, sepsis;
9. explain Guillain-Barre Syndrome, Reye's Syndrome;
10. describe health care associated infections and define HIV/AIDS; and
11. explain progressive multifocal leukoencephalopathy and tropical spastic paraparesis.

Course Contents
Central nervous system, encephalitis, meningitis, tetanus. Respiratory tract, mumps, TB, pneumonia, pertussis. Gastrointestinal tract, gastroenteritis and food poisoning. Genitourinary system, sexually transmitted disease and urinary tract infection, P. I. D. Cardiovascular system, infective endocarditis, rheumatic heart disease. Skin, pyoderma, cellulitis and myiasis, leprosy. Musculoskeletal system, osteomyelitis, abscesses, wound infections and pyomyositis, conjunctivitis. General principles of antibiotic and chemotherapy, modes of bacterial resistances to antibiotics, viral vaccines, prophylactic immunization. Pyrexia of unknown origin (PUO). Bacteria/septicaemia (sepsis) Guillain – Barre Syndrome. Reye's Syndrome. Health care associated infections. HIV/AIDS. Progressive multifocal leukoencephalopathy. Tropical spastic paraparesis.

CPY 401: Clinical Chemistry of Disease II (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe how to order clinically appropriate tests for disorders of the hypothalamo-pituitary axis;
2. illustrate how to conduct pregnancy test;
3. appreciate the ability to evaluate an infertile couple;
4. conduct hydrogen breath test; and
5. explain the role of tumour markers in screening, diagnosis.

Course Contents
Hypothalamo, Neuro and adreno hypophysis, functions, dysfunctions and investigations. Pituitary, thyroid functions, dysfunctions and investigations. Biochemical assessment of gonadal function in men and women. Investigations of fertility disorders. Biomarkers of

cardiovascular disease. Adrenocortical function, dysfunction and disorders. Biochemical changes in pregnancy. Diagnosis of pregnancy. Assessment of foetal and placental integrity. Role of chemical pathology in the diagnosis and management of cancer. Gastrointestinal functions, dysfunction and investigations, xylose absorption, pancreolauryl test, PABA test, faecal elastase, disaccharidases test, Schilling's test, hydrogen breath test. The role of tumour markers in screening, diagnosis, treatment and monitoring of cancers.

CPY 403: Analytical Procedures and Practicals (2 Units C: PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. demonstrate how to send suitable samples to the laboratory;
2. determine blood gases and blood PH;
3. estimate blood glucose by the glucose oxidase method (a specific method), and by the ferricyanide reduction method (a nonspecific method);
4. determine urine specific gravity osmolality and qualitative tests for protein, glucose and reducing substances, ketones, bilirubin, urobilinogen and blood;
5. demonstrate spectroscopy of haemoglobin and its derivatives in blood;
6. apply non-invasive modern methods of monitoring hyperbilirubinaemia such as cutaneous bilirubinometry;
7. determine occult blood in faeces.
8. estimate protein with different methods;
9. conduct electrophoresis of plasma proteins, haemoglobins and iso-enzymes;
10. demonstrate column chromatography;
11. conduct paper and thin layer chromatography of sugars and amino acids in urine;
12. demonstrate determination of serum enzymes;
13. conduct radioimmunoassay of hormones in blood; and
14. estimate 17-oxosteroid in urine, biochemical analysis of cerebrospinal fluid.

Course Contents

Specimen collection, different types of samples, tubes, sample identification, separation of plasma or serum, collection and preservation of urine specimens. Determination of blood gases and blood PH. Determination of glucose. Glucose estimation in blood by the glucose oxidase method (a specific method), Glucose estimation in the same blood by the ferricyanide reduction method (a nonspecific method) and strip test for glucose in blood (semiquantitative method). Plotting of oral glucose tolerance test curves for a normal patient and a diabetic patient. Urinalysis. Determination of urine specific gravity osmolality and qualitative tests for protein, glucose and reducing substances, ketones, bilirubin, urobilinogen and blood. Haemoglobin and haemoglobin derivatives in urine. Spectroscopy of haemoglobin and its derivatives in blood. Non-invasive modern methods of monitoring hyperbilirubinemianaemia such as cutaneous bilirubinometry. Estimation of blood gases, including use of pulse oximeter. Occult blood in faeces. Different methods of protein estimation. Electrophoresis of plasma proteins, haemoglobins and isoenzymes demonstration. Column chromatography, paper and thin layer chromatography of sugars and amino acids in urine. Determination of serum enzymes. Radioimmunoassay of hormones in blood. Estimation of 17-oxosteroid in urine, biochemical analysis of cerebrospinal fluid (CSF). Methods of vitamin analysis in blood. Estimation of immunoglobulins. Agglutination/Agglutination inhibition tests. Immunoelectrophoresis and gel Immunodiffusion technique.

HAE 401: General Haematology II: Anaemias (2 Units C: LH 15; PH 45)

Learning Outcomes

At the end of this course, students should be able to:

1. define iron metabolism;
2. enumerate causes, manifestations, diagnosis and treatment of IDA;
3. list the causes, manifestations and treatment of iron overload;
4. describe metabolism of folates and vitamin B12;
5. enumerate the causes, clinical manifestations, laboratory features and treatment of megaloblastic anaemia;
6. discuss the aetiology, manifestations, lab findings and differential diagnoses of AA;
7. differentiate myeloblastic and leucoerythroblastic anaemias;
8. describe the aetiology, pathogenesis, laboratory findings and treatment of anaemia of chronic disorders;
9. classify haemolytic anaemia;
10. discuss the pathophysiology, clinical and laboratory evaluation of haemolytic anaemia;
11. describe the spectrum of haemoglobin disorders;
12. explain sickle cell diseases including their inheritance patterns, molecular genetics, pathophysiology, clinical and laboratory features, complications, prevention, treatment;
13. explain thalassaemias, genetic counselling and antenatal diagnosis of globin disorders;
14. describe the pathology, clinical and lab findings of common red cell membranopathies; and
15. discuss the pathology, genetics, clinical and lab findings of common red cell enzymopathies.

Course Contents

Iron sources, absorption, transportation, storage and metabolism. Deficiency anaemia. Iron overload, haemosiderosis/haemochromatosis. Megaloblastic anaemias. Sources, absorption, transportation and storage of folates and vitamin B12. Folate deficiency. Vitamin B12 deficiency, clinical features, laboratory findings, diagnosis and treatment. Aplastic anaemia, myelopathic anaemia and leucoerythroblastic anaemia. Anaemia of chronic diseases. Chronic infections. Chronic inflammation. Clinical and laboratory features. Differential diagnoses. General aspects of haemolytic anaemias. Definition, types. Intravascular and extravascular haemolysis and their clinical and biochemical features. Inherited vs acquired. Haemoglobinopathies. Sickle cell diseases, thalassemia, genetic counselling, antenatal diagnosis of haemoglobinopathies. Red cell membranopathies, Spherocytosis, elliptocytosis, stomatocytosis. Others. Red cell enzymopathies. G6PD deficiency, pyruvate kinase deficiency. Acquired haemolytic anaemias, auto immune. Warm/cold. Microangiopathy. Mechanical contact anaemia. Red cell infections-malaria.

HAE 403: Haemato-Oncology and Bleeding Disorders (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the pathophysiology, clinical presentations, laboratory features and treatment principles of the acute leukaemia;
2. discuss the pathophysiology, clinical presentations, laboratory features and treatment principles of the chronic leukaemia;
3. describe the spectrum, pathophysiology, clinical presentations, laboratory features and treatment principles of the non-leukemic MPDs;
4. define the pathology of PNH and MDS;

5. explain the epidemiology, aetiopathogenesis, morphology, clinical features, investigations, staging and treatment of the lymphomas;
6. describe the aetiopathogenesis clinical features, investigations, treatment, complications of MM and related disorders;
7. demonstrate competence in enumeration of the differential diagnoses of lymphadenopathy in HIV infection;
8. enumerate the concept and steps involved in primary and secondary haemostasis;
9. describe the principles behind, and clinical utility of simple tests of haemostasis;
10. explain the clinical pattern of bleeding in platelet disorders, as compared to coagulation factor deficiency bleeding;
11. discuss the aetiology, pathogenesis, clinical manifestations, laboratory findings, treatment of ITP;
12. demonstrate competence in enumerating other causes of platelet-related bleeding;
13. describe the spectrum of inherited coagulation factor deficiencies and related bleeding disorders;
14. illustrate the spectrum of acquired bleeding disorders;
15. describe the aetiology, pathogenesis, clinical presentation, laboratory features and treatment of DIC;
16. discuss the mechanisms, clotting abnormalities, and treatment of haemorrhagic disease of the newborn and CLD;
17. explain the principles of anticoagulant therapy and monitoring;
18. list the characteristics of the antigens and antibodies to ABO and Rh blood group systems;
19. discuss the aetiopathogenesis, manifestations, investigations and treatment of HDFN due to ABO and Rh incompatibilities; and
20. explain the general principles of ABO/Rh blood grouping and cross-matching.

Course Contents

Acute leukaemia myeloblastic (AML), lymphoblastic (ALL), clinical presentation, laboratory findings and treatment. Chronic leukaemias myeloid (CML), lymphocytic (CLL), clinical presentation, laboratory findings and treatment. Non-Leukemic myeloproliferative disorders. Polycythaemia rubra vera, myelofibrosis, essential thrombocythemia. The lymphomas, hodgkin (HL), non-Hodgkin's (NHL), Burkitt's (BL) clinical presentation, laboratory findings and treatment. Multiple myeloma clinical presentation, laboratory findings and treatment. Miscellaneous disorders, paroxysmal nocturnal haemoglobinuria, myelodysplastic syndrome. HIV Infection and Haematological manifestations. Clinical staging of HIV infection, anaemia in HIV infection, leucopaenia in HIV Infection, thrombocytopenia in HIV Infection. clotting profile abnormalities in HIV. Differential diagnoses of lymphadenopathy in HIV Infection. Haemostasis and thrombosis. Normal haemostasis, coagulation cascade, fibrinolysis, tests of haemostasis, bleeding time, PT/PTTK/TT, fibrinogen assay and titre, FDP/D-dimer. Platelet disorders. General pattern of bleeding in platelet disorders, idiopathic thrombocytopenia, other causes of platelet-related bleeding including drugs. Inherited bleeding disorders. Haemophilias, inheritance pattern, clinical presentation, laboratory investigations and treatment. Von Willebrand's disease. Acquired bleeding disorders, liver diseases, disseminated intravascular coagulopathy, haemorrhagic disease of the newborn. Thrombotic disorders. Deep vein thrombosis, pulmonary embolism and anticoagulant therapy and monitoring.

MED 401: Introduction to Clinical Medicine I (2 Units C: LH 30)

Learning Outcomes

At the end of this course, students should be able to:

1. demonstrate sound theoretical knowledge and skills in the subject of the clinical interview;
2. demonstrate sound clinical skills in both general and systemic examinations;

3. investigate patients with utmost prioritisation;
4. demonstrate skills to manage and prevent diseases as may be applicable;
5. identify the key ethical issues;
6. recognise the elements of good clinical practice in contemporary medical practice;
7. define basic medical terms and specific terms in various branches/sub-specialties of internal medicine; and
8. identify components of the clinical interview.

Course Contents
Approach to the clinical interview. Basic clinical skills and approach to the clinical examination. Demonstration on how to elicit basic physical signs. Emphasis on technique and general approach to the patient. Immunological and genetic basis of diseases. Tutorials on elementary clinical medicine with emphasis on applied basic medical sciences (including basic principles of radiology).

MED 405: Cardiology I (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate knowledge and skills in cardiology;
2. recognise and manage common cardiac diseases especially in our environment;
3. respond to cardiovascular emergencies;
4. recognise cases that would need referral to specialised centres;
5. attain sound knowledge of the interaction between environment; and
6. identify risk factors, and genes in relation to cardiovascular diseases.

Course Contents
Approach to the evaluation of the cardiac patients and common symptomatology in cardiovascular diseases. Chest pain. Dyspnoea. Orthopnoea. Paroxysmal nocturnal dyspnoea and palpitations. Approach to cardiovascular system examination, the precordium, valvular areas, heart sounds and murmurs. Introduction to common cardiovascular diseases, hypertension, heart failure (epidemiology, clinical features, mechanisms/pathophysiology, investigation and diagnosis). Introduction to ECG.

MED 407: Nephrology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate knowledge and exhibit sound clinical skills in nephrology;
2. recognise and manage common renal diseases especially in our environment;
3. investigate patients with utmost prioritisation; and
4. manage and prevent the disease as may be applicable.

Course Contents
Electrolyte imbalance. Clinical features. Common causes. Investigations, and management. Valuation of glomerular diseases. Glomerulonephritis. Nephrotic syndrome. Urinary tract infection. Pyelonephritis. Immune-complex-mediated kidney disease (quartan malarial nephropathy).

MED 409: Clinics, Call Duty and Bed Side Teaching I (13 Units C: PH 585)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of MED 401 to 407;
2. demonstrate hands-on detailed clinical interview and physical examination skills;
3. illustrate doctor patient relationship and define patient education;
4. explain ethics of clinical practice; and
5. discuss professionalism.

Course Contents
Clinical evaluation according to the principles of MED 401 to 407. Hands-on demonstration of the clinical interview and examination skills, doctor patient relationship, patient education, ethics of clinical practice, and professionalism.

SUG 401: General Surgery I (5 Units C: LH 75)

Learning Outcomes
At the end of this course, students should be able to:
1. describe how to take detailed history;
2. perform physical examination;
3. investigate patients with surgical diseases;
4. demonstrate competence in typical clinical presentation of surgery patients;
5. explain diagnosis from symptoms and signs; and
6. discuss the multidisciplinary nature of surgical practice.

Course Contents
History and physical examination of the surgical patient. Physical signs in clinical surgery. Pre-operative preparation and post-operative care of patients. HIV-AIDS and the surgeon. COVID-19 and the surgeon. Universal precautions. Safe surgery. Multi-disciplinary health care team approach. Principles of surgery. Herniae. Lumps.

SUG 403: Paediatric Surgery (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify symptoms and signs of common paediatric surgical diseases;
2. describe diagnosis from symptoms and signs;
3. examine paediatric surgery patients; and
4. discuss complications that may arise from common paediatric surgical diseases.

Course Contents
Congenital anomalies, particularly the more manageable lesions of the gut, exomphalos, gastroschisis, intestinal atresia, malrotation and mid-gut volvulus. Hirschsprung's diseases and anorectal agenesis of the lower gastrointestinal tract. Groin and scrotal masses, hernias, hydroceles. Congenital infantile hypertrophic pyloric stenosis, causes of jaundice such as biliary atresia, choledochal cysts. Hypospadias and exstrophy-epispadias complex. Causes of intestinal obstruction, intussusception. Other congenital malformations and their management.

SUG 405: Clinics, Theatre and Call Duty Bed Side Teaching I (13 Units C: PH 585)

Learning Outcomes
At the end of this course, students should be able to:
1. conduct clinical evaluation according to the principles of SUG 401 to 405.

Course Contents
Clinical evaluation according to the principles of SUG 401 to 405.

SDM 401: Science of Dental Materials (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify frequently used materials in dentistry;
2. distinguish between frequently used materials in dentistry;
3. discuss the properties that influences the selection of materials; and
4. classify dental materials by application and or chemistry.

Course Contents
Introduction to dental materials. Basic requirements and general properties of dental materials. Gypsum products. Dental waxes. Dental impression materials. Polymers and polymerisation. Metals used in dentistry. Casting and investment procedures. Denture base materials. Elastomeric impression materials. Dental cements. Cavity liners. Bases and varnishes. Dental amalgam. Bonding. Tooth-coloured filling materials. Root canal sealants. Ceramics.

SDM 403: Science of Dental Materials Practicals (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. identify; and
2. manipulate common materials in dentistry, including cements, impression materials and others.

Course Contents
Measurements of physical properties of dental materials in the dental laboratory. Physical and chemical tests of materials such as knoop's hardness test. Manipulation of materials used in dentistry, mixing of cements, mixing impression materials.

CON 401: Cariology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe all factors and their roles in the formation of caries;
2. identify and distinguish caries from tooth-wear lesions;
3. discuss the prevention of caries;
4. describe caries management by risk assessment; and
5. describe socio-economic implications of caries.

Course Contents
Aetio-pathogenesis of caries oral pathology. Microbiology of caries oral pathology. Immunology of dental caries oral pathology. Clinical appearance and presentations of dental caries. Conservative dentistry. Clinical detection of carious lesions. Conservative dentistry. Tooth-wear lesions. Restorative dentistry. Caries risk assessment. Paediatric dentistry. Treatment of non-cavitated lesions. Paediatric dentistry. Measurement of dental caries. Dental public health. Epidemiology of dental caries. Dental public health. Prevention of dental caries. Economic and policy implications of dental caries. Dental PH.

CON 403: Operative Techniques (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. list and discuss the different causes of tooth loss;
2. explain tooth restorations;
3. describe the properties and manipulation of materials vis a vis the lost structure; and
4. contrast between amalgam and composite including amalgam phase-down.

Course Contents
Introduction and familiarisation with materials, basic procedures and concepts in conservative dentistry. Principles of tooth preparation and minimum intervention dentistry, including fundamentals of tooth preparation, pulp protection, enamel and dentin adhesion.
Designing cavities for various restorations, materials and techniques in restorative dentistry. Principles of cavity preparation, moisture control, restoration of the cavity with missing walls, and complex cavities. Retentive aids for plastic restorations, amalgam restorations, composite restorations, intra-coronal cast metal restorations.

CON 405: Operative Techniques Practicals (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. prepare cavities in soap and plaster models;
2. apply rubber dam;
3. prepare occlusal and cervical cavities;
4. prepare proximal and incisal cavities; and
5. restore with amalgam and composite.

Course Contents
Preparation of cavities in soap and plaster models. Application of rubber dam. Preparation of occlusal cavities (class i). Preparation of cervical cavities (class v). Preparation of proximal cavities (class ii and iii). Preparation of incisal cavities (class iv). Restoration with amalgam and composite.

PRT 401: Prosthetic Techniques (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the laboratory steps involved in full denture construction;
2. enumerate the principles of support, retention, stability, aesthetics and preservation of healthy tissue;
3. apply knowledge from the study of material science in the manipulation of materials for making prosthesis;

4. explain retention stability and support in complete dentures; and
5. develop objective means of judging aesthetics in complete dentures.

Course Contents
Retention, stability and support. Aesthetics and preservation of residual structure, parts and surfaces and how its form achieves the goals of fabrication. Bite registration, the scope of prosthetic dentistry and introduction to the dental laboratory, goals of complete denture fabrication, the complete denture, concept of occlusion in complete dentures. Impressions, record blocks and their significance. Face-bows, articulators, and transfer of records to articulators, setting teeth and the trial appointment, denture processing.

PRT 403: Prosthetic Practicals (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate the work of the technologist by learning to do same;
2. gain an appreciation of how theoretical principles are translated to practical appliances;
3. make quality assurance checks on jobs from the laboratory during practice; and
4. discuss and perform all laboratory steps involved in complete denture fabrication.

Course Contents
Bite-block fabrication and manipulation of gypsum. Arbitrary mounting of bite blocks on articulators. Setting teeth to bilateral balanced occlusion. Fabrication of the wax trial denture.

PAT 402: Systemic Pathology II (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. describe congenital anomalies (epispadias, hypospadias, phimosis), cryptorchidism, orchitis, ambiguous genitalia, testicular torsion, tumours, BPH, and prostate cancer;
2. explain abnormalities of Mullerian duct fusion, PID, vulval dystrophy, vulva/vaginal cancer, chronic cervicitis, CIN and cervical cancer, DUB, endometritis, endometrial hyperplasia, endometriosis and adenomyosis, uterine tumours, ovarian cysts, ovarian tumours and Pre-eclampsia, ectopic pregnancy and gestational trophoblastic diseases;
3. enumerate inflammatory disorders of acute mastitis, mammary duct ectasia, fat necrosis, granulomatous mastitis, benign epithelial lesions- fibrocystic change, proliferative breast disease, breast carcinoma and male breast, gynaecomastia, carcinoma; and
4. discuss fractures, rickets/osteomalacia and osteoporosis, genetic bone disorders, osteomyelitis, bone tumours, paget's disease, arthritis and (osteoarthritis, rheumatoid arthritis, septic arthritis, seronegative arthritis), gout and other crystal arthropathies.

Course Contents
Male genitalia. Congenital anomalies (epispadias, phimosis, posterior urethral valve), cryptorchidism, orchitis, ambiguous genitalia, testicular tumours, BPH, prostate cancer. Female genitalia. Congenital anomalies (abnormalities of Mullerian duct fusion), PID, vulval dystrophy, vulva/vaginal cancer, CIN, cervical cancer, endometriosis, endometritis, endometrial hyperplasia, uterine tumours, ovarian cysts, ovarian tumours, pre-eclampsia, ectopic pregnancy, gestational trophoblastic diseases. Breast, inflammatory disorders (acute mastitis, mammary duct ectasia, fat necrosis, granulomatous mastitis), benign epithelial lesions (fibrocystic change, proliferative breast disease), gynaecomastia, breast tumours. Urinary system, renal cysts, glomerulonephritis, tubulo-interstitial nephritides, obstructive uropathy, nephropathy associated with malaria and other infections and infestations.

thrombotic microangiopathies, congenital anomalies, renal tumours, cystitis, bladder cancer. Musculoskeletal system, fractures, rickets/osteomalacia, osteoporosis, genetic bone disorders, osteomyelitis, bone tumours, pagets disease, arthritis (osteoarthritis, rheumatoid arthritis, septic arthritis, seronegative arthritis, gout and other crystal arthropathies). Central nervous system, raised intracranial pressure, hydrocephalus, congenital anomalies, stroke, head injuries, intracranial haemorrhage, meningitis, encephalitis, brain abscess, demyelinating disorders, neurodegenerative disorders (Alzheimer's, Parkinson's, Huntington's chorea), spongiform encephalopathies, CNS tumours, skin, acute and chronic dermatoses, bullous diseases, verrucae, common skin infections, non-melanoma skin cancers (squamous cell carcinoma, basal cell carcinoma, and Kaposi sarcoma), melanoma.

PAT 404: Forensic Pathology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. identify types of wounds and injuries;
2. describe firearm and firearm injuries;
3. discuss sudden unexpected death;
4. define identification;
5. explain doctor at the scene of death and in court;
6. recognise signs of death;
7. conduct post-mortem examination;
8. discuss medical jurisprudence;
9. explain sexual offences;
10. describe asphyxia and drowning;
11. conduct medico-legal examination and report writing;
12. describe death certification; and
13. discuss confidentiality and medical ethics.

Course Contents
Types of wounds and injuries. Firearm and firearm injuries. Signs of death. Sudden unexpected death. Identification. Doctor at the scene of death. Doctor in court, post-mortem examination. Medical jurisprudence. Sexual offences. Criminal abortion. Hanging. Suffocation. Electrocution. Asphyxia. Drowning and investigation of poison death. Medico-legal examination and report writing. Death certification. Confidentiality and medical ethics.

PCL 402: Clinical Toxicology Pharmacology (1 Units C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the mechanisms of intoxication by heavy metals and the approaches to treatment;
2. describe mechanism, sources and treatments of cyanide poisoning;
3. discuss intoxication with insecticides;
4. enumerate types of insecticides, mechanisms of toxicity and treatments;
5. list classes of snakes and major toxic effects; and
6. describe pharmacology of snake venom.

Course Contents
Clinical Toxicology. Intoxication with heavy metals (mercury, arsenic, lead). Heavy metal antagonists (dimercaprol, EDTA, penicillamine). Cyanide poisoning and treatment. Intoxication with insecticides. Chlorinated hydrocarbons, organophosphates and cholinesterase reactivators. Pharmacology of snake venoms. Elapid venoms. Viperid venoms.

PCL 404: Central Nervous System Pharmacology (1 Units C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the role of COX and PGs in inflammation, pain and fever;
2. identify the role of PGs in homeostatic regulation of gastric function, kidney function, vasoconstriction and platelet activation;
3. describe basic pharmacology of the different classes of NSAIDs;
4. discuss the rationale behind use of low-dose aspirin as prophylactic in CV disease;
5. describe mechanism of salicylate toxicity caused by aspirin and its treatment;
6. explain mechanism of acetaminophen poisoning and its treatment;
7. illustrate the opioid system and its role in pain transduction;
8. describe pharmacology of narcotic analgesics and antagonists; and
9. discuss opioid-induced tolerance, physical dependence, addiction and pseudo-addiction.

Course Contents

Pain and Analgesics. Narcotic analgesics opioid system. Receptors, endogenous ligands, signal transduction pathways, role in pain. Concept of opioid-induced tolerance, physical dependence, addiction and pseudo-addiction. Basic pharmacology of narcotic analgesics (morphine, pethidine, methadone and congeners), narcotic antagonists, full and partial antagonists (nalorphine, levallorphan, naloxone). Non-Steroidal Anti-Inflammatory drugs (NSAIDs). Role of cyclo-oxygenase and prostaglandins in aetiology of inflammation, pain and fever, role of prostaglandins in homeostatic regulation of gastric function, kidney function, vasoconstriction and platelet activation. Basic pharmacology of NSAIDs (aspirin and salicylates, traditional NSAIDs, COX-2 inhibitors, acetaminophen). Rationale behind unique indication for low-dose aspirin as prophylactic treatment in development of CV disease. Pharmacokinetics of aspirin and the mechanism that lead to the development of salicylate toxicity. Mechanism underlying acetaminophen poisoning and its treatment. Epilepsy and Antiepileptic Drugs. Different types of seizures. Seizure types as determinants of specific antiepileptic drugs used in management. Spectrum of action of most commonly used drugs. Selection process of an epileptic drug for a given seizure type, based on its mechanism of action efficacy, clinical pharmacokinetics (ease of use), drug-drug interaction potential, tolerability (common side effects), serious toxicity (idiosyncratic reactions). Role of co-morbidities in the selection of an epileptic drug. Antidepressants Primary sites of action of the different classes of antidepressants, Tricyclic antidepressants, TCAs, (imipramine, amitriptyline, clomipramine, desipramine, doxepin). Selective-serotonin reuptake inhibitors, SSRIs, (citalopram, fluoxetine, fluvoxamine, paroxetine, sertraline), Noradrenaline/serotonin reuptake inhibitors, SNRIs, (Venlafaxine, desvenlafaxine, nefazodone), monoamine oxidase inhibitors, MAOIs, (Irreversible, phenelzine, tranylcypromine and selegiline and reversible such as moclobemide). Adverse side effects of the different classes with respect to use in certain population (elderly, pregnancy), Pharmacological sites of actions that contribute to the acute or chronic side effects of these drugs. Proposed mechanism underlying the delayed therapeutic effects. Considerations in using irreversible MAOIs, their potential adverse effects and the important considerations in switching between MAOIs and SSRIs or other antidepressants. Antipsychotic drugs, the four well-defined dopamine systems in the brain as they relate to antipsychotic drug action and side effects. Distinction between the typical (chlorpromazine, haloperidol) and atypical antipsychotics (risperidone, olanzapine, quetiapine, ziprasidone, aripiprazole, paliperidone); difference in mechanism of action between the typical antipsychotics, atypical antipsychotics and the partial agonist, aripiprazole, common and rare side effects associated with use of both low potency and high potency antipsychotics as well as the second-generation antipsychotics. Sedative-Hypnotic Drugs used in treating anxiety and sleep disorders. Sleep and wakefulness. Structural aspects of GABAA receptor and the receptor. components (binding sites) mediating

the effects of drugs that modulate GABAA receptor activity. Differences between benzodiazepines with respect to time of onset, potency, metabolism and elimination half-lives. Similarities and differences between the benzodiazepines and the barbiturates in producing sedative-hypnotic effects. Factors to consider in choosing the most appropriate drug for specific clinical situations and/or individuals. Characteristics of benzodiazepines and other sedative-hypnotics that contribute to different degrees of abuse liability and withdrawal symptoms. Target sites or putative mechanisms of non-benzodiazepine drugs that can be used to treat sleep disorders, Barbiturates, bromides, cyclic ethers, paraldehyde, carbamic acid esters (meprobamate), chloral derivatives (chloral hydrate) piperazine dienes (glutethimide, methyprylon) alcohols. Target sites of action for SSRIs and strategy for using SSRIs in combination with benzodiazepines in the treatment of anxiety. Bipolar affective disorder and drugs used in management. Target sites of action for lithium, its pharmacokinetics, adverse effects and considerations in its use. Sites of action, adverse effects and considerations in using anticonvulsants (carbamazepine, lamotrigine, valproate) and the atypical antipsychotics (aripiprazole, olanzapine, quetiapine, risperidone, ziprasidone) to treat bipolar disorder. Potential risks of birth defects with use of lithium, valproate, carbamazepine and lamotrigine in pregnant women. Parkinson's disease and drugs used in management. Pathophysiology of Parkinson's disease and its presentation; functional circuitry of the nigrostriatal system. Major classes of drugs used in management and the timeline for their use, indications, mechanism of action, adverse effects and contraindications. Types and mechanisms of alternative treatments. Local Anaesthetics. Mechanism by which local anaesthetics block nerve conduction, how their physiochemical properties (esters and amides) influence their pharmacodynamics and pharmacokinetics. The side effects that may occur with their use and why they occur. Unique characteristics and the common clinical use for each prototypical local anaesthetic. Common uses with emphasis on spinal and epidural anaesthesia, commonly caused severe complications of their use. General anaesthetics. Definition of general anaesthesia and how it is achieved, stages of anaesthesia. Pharmacokinetics of inhalational anaesthetics. Blood, gas coefficient, ventilation rate and pulmonary blood flow influence on the onset (and termination) of action of inhalational anaesthetics, influence of tissue blood flow on the tension of anaesthetic gas in that tissue, definition of minimum alveolar concentration (MAC) and what information it provides on a volatile anaesthetic. Pharmacokinetic properties of the ultra-short-acting hypnotics and how they make this class of drugs popular general anaesthetic drugs. Advantages and disadvantages of clinically used inhaled and intravenously administered general anaesthetics, when they should be used, their contraindications. Concept that inhalational and intravenous anaesthetics cause varying degrees of respiratory depression with exception of ketamine. Use of anaesthetics in persons already taking drugs such as neuromuscular blocking drugs and CNS stimulants.

PCL 406: Endocrine Pharmacology (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. explain the role of thyroid hormone in regulating development, metabolism and calorigenesis;
2. identify the steps in synthesis of T4 and T3 and discuss the endocrine regulation of T3 and T4 production and feedback loops, physiological role of T3 and T4 and changes associated with hypo- and hyperthyroidism;
3. enumerate the various thyroid hormone preparations and thyroid hormone antagonists (classes and examples) and describe the pharmacology of thyroid hormone preparations and thyroid hormone antagonists;
4. explain the use of adjunct drugs in treatment of hyperthyroidism;

5. describe the role of ACTH and HPA axis in regulation of corticosteroid synthesis and the principal physiological responses to both glucocorticoids and mineralocorticoids;
6. explain the use of synthetic glucocorticoid and mineralocorticoid drugs in management of the specified endocrine disorders; and
7. describe the pharmacology of adrenocorticosteroids synthetic analogues and inhibitors.

Course Contents

Drugs used in endocrine disorders. Physiology of neuroendocrine hormonal regulation, specifically the regulation and function of the hypothalamus pituitary growth hormone axis. Hypothalamus pituitary reproductive axis. Hypothalamus pituitary prolactin axis. Adenohypophysis hormones and related substances, anterior and posterior pituitary hormones, ACTH, growth hormone, prolactin, thyrotropin, gonadotropic hormones. Use of specific neuroendocrine drugs in the treatment of growth hormone deficiency (recombinant HGH, somatropin, synthetic GHRH, sermorelin, recombinant IGF-1). Growth hormone excess (octreotide, Pegvisomant). Infertility (HCG, menotropins, urofollitropin, follitropin, synthetic GHRH and analogues, Gosselin, GnRH antagonists, ganirelix) and Hyperprolactinaemia (dopamine receptor antagonists, bromocriptine). Indications, mechanism of action, adverse effects, contraindications and therapeutic considerations for the major neuroendocrine hormones and pharmacological drugs. Adrenocortical steroids. Role of ACTH and HPA axis in regulation of corticosteroid synthesis. Principal physiological responses to both glucocorticoids and mineralocorticoids, especially role of cortisol and exogenous glucocorticoids in negative feedback suppression of the HPA axis. Use of synthetic glucocorticoid and mineralocorticoid drugs in treatment of adrenal insufficiency and congenital adrenal hyperplasia; therapeutic uses of adrenocorticosteroid in non-endocrine disease, asthma, rheumatoid arthritis, inflammation and cancer. Pharmacology of adrenocorticosteroids synthetic analogues (hydrocortisone, cortisone, prednisone, prednisolone, dexamethasone) and inhibitors (metyrapone, aminoglutethimide.). Diabetes mellitus pathophysiology, type I and II, fundamental differences in types, diagnostic criteria and therapeutic goals. Pharmacological differences between the various insulin formulations, especially in their duration of action (rapid-regular- intermediate- and long-acting insulins), specifically which insulin types are used to control post-prandial glucose levels versus fasting glucose levels. Use and clinical benefits of an intensive insulin therapy regimen in type I diabetes. Indications, mechanism of action, clinical effects, adverse effects and contraindications of drugs used in management of type II diabetes. Sulphonylureas, biguanides, meglitinides, thiazolidinediones, alpha-glucosidase inhibitors, modulators of incretin pathway, pramlintide, glucagon, insulin, understanding which drugs used for treatment of type II primarily affect either post-prandial or fasting glucose levels. Concept of combination therapy with oral drugs, as well as potential use of insulin therapy in type II. Current treatment algorithm approved by the American Diabetes Association for type II diabetes. Effectiveness of tight glycaemic control in prevention of macro- and microvascular complications; treatment of diabetic ketoacidosis. Thyroid and Anti-thyroid Drugs. Role of thyroid hormone in regulating development, metabolism and calorigenesis. Steps in synthesis of tetraiodothyronine (T4) and triiodothyronine (T3), endocrine regulation of T3 and T4 production and feedback loops, physiological role of T3 and T4 and changes associated with hypo- and hyperthyroidism. Thyroid hormone preparations. Thyroid hormone antagonists, thioamides, propylthiouracil, methimazole, carbimazole, thiocyanate, ionic inhibitors, perchlorate, Iodine, other drugs, propranolol and hydrocortisone. Gonadal hormones, oestrogens and progestins, physiological actions, pharmacological effects, clinical uses (contraception and hormonal replacement therapy in menopause), adverse effects and contraindications, pharmacological actions and clinical uses of selective oestrogen receptor modulators (SERMs). Androgens, physiological actions, pharmacological effects, clinical uses, adverse effects and contraindications of androgens (testosterone,

dihydrotestosterone, methyltestosterone) and their antagonists (finasteride, flutamide, spironolactone).

PCL 408: Chemotherapy (1 Unit C: LH 15)

Learning Outcomes

At the end of this course, students should be able to:

1. describe host-drug-pathogen relationship in chemotherapy;
2. list the various ways of classification of antimicrobials based on type of organism against which primarily active, chemical structure, spectrum of activity;
3. define the common terminologies used in antimicrobial chemotherapy and enumerate the properties of an ideal antimicrobial agent;
4. describe the concept of combination therapy and identify the choices of antibacterial drugs used to treat common infections and enumerate the classes of antibacterial agents;
5. explain pharmacology of β-lactam antibiotics including their potential for cross-allergenicity, distribution characteristics, and contraindications of each group;
6. discuss the differences in spectrum of activity between the natural penicillins, the penicillinase-resistant penicillins, the aminopenicillins, the carboxypenicillins, the ureidopenicillins and the β-lactamase inhibitor combinations with attention to the specific drugs that have activity against Staph. aureus, Pseud. aeruginosa and Bact. fragilis;
7. list the differences in spectrum of activity between the four generations of cephalosporins, as well as the carbapenems and aztreonam, pharmacology of the cephalosporins, the carbapenems and aztreonam, including risk of cross-reactivity between these classes and the penicillins;
8. explain the pharmacology of the various generations of quinolones, particularly those with activity against Staph. aureus, Strep. pneumonia, Pseud. aeruginosa, atypical bacteria and anaerobes;
9. describe pharmacology of aminoglycosides, with attention to drugs that display activity against Staph. aureus, Pseud. aeruginosa and tuberculosis;
10. enumerate factors that may alter pharmacokinetics of aminoglycosides and their dosage;
11. explain pharmacology of vancomycin and other drugs with activity against gram-positive aerobes;
12. describe pharmacology of tetracyclines and sulphonamides and the potential therapeutic advantages of the glycylcycline antibiotics and discuss pharmacology of clindamycin and metronidazole;
13. explain the necessity of dosage adjustment of antibacterial therapy in renal insufficiency and removal by haemodialysis;
14. describe the mechanisms by which bacteria develop resistance to the different classes of antibacterial agents;
15. enumerate treatment principles in tuberculosis, including major determinant outcome of treatment and ways to improve this;
16. explain the mechanisms of resistance in TB infection and reasons for resurgence and ways to stop epidemic;
17. describe the therapeutic indications of rifampicin and explain the pharmacology of antituberculosis drugs;
18. discuss pharmacology of drugs used in the treatment of leprosy;
19. enumerate distinctions between protozoal and helminth infections;
20. discuss the general approaches to anti-parasitic and anti-helminthic therapy;
21. list the drugs used in treatment of the specified parasitic and helminthic infections;
22. explain the pharmacology of the major drugs used in treatment of protozoal and helminth infections; and
23. list factors that lead to antimicrobial treatment failure.

Course Contents

Definition of common pharmacodynamics terminology used to describe the effects of antimicrobial therapy. Bacteriostatic. Bactericidal. Concentration-dependent and time-dependent bactericidal activity. Antimicrobials that display each of these properties. Combinations of antibiotics. Choice of antibacterial drugs in common infections. Penicillin, differences in chemical structure between the penicillins. Cephalosporins. Carbapenems and monobactams. General characteristics of β-lactam antibiotics including their mechanism of action. Elimination half-life, route of elimination and potential for cross-allergenicity. Differences in spectrum of activity between the natural penicillins. The penicillinase-resistant penicillins. The aminopenicillins. The carboxypenicillins. The ureidopenicillins and the β-lactamase inhibitor combinations with attention to the specific drugs that have activity against Staph. aureus, Pseud. aeruginosa and Bact. fragilis, distribution characteristics into the cerebrospinal fluid, urinary tract, lungs, skin/soft tissue and bone. Indications. Mechanism of action. Adverse effects and contraindications of each group. Mechanism by which bacteria develop resistance to penicillins. Cephalosporins, carbapenems and monobactams. Differences in spectrum of activity between the four generations of cephalosporins, as well as the carbapenems and aztreonam, indications, mechanism of action, adverse effects and contraindications, mechanism by which bacteria develop resistance, pharmacokinetics particularly those drugs that penetrate the CNS and those that require dosage adjustment; risk of cross-reactivity between these classes and the penicillins, major clinical uses of representative drugs within each generation of cephalosporin, carbapenems and aztreonam. Quinolones. The various generations, spectrum of activity of the older and respiratory fluoroquinolones, particularly those with activity against Staph. aureus, Strep. pneumonia, Pseud. aeruginosa, atypical bacteria and anaerobes, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs. Major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in renal insufficiency and removal by haemodialysis. Aminoglycosides. Spectrum of activity with attention to drugs that display activity against Staph. aureus, Pseud. aeruginosa and tuberculosis, indications, mechanism of action, adverse effects, contraindications and major drug interactions; mechanism of resistance to the drugs, major pharmacokinetic characteristics including understanding of patient characteristics that may alter the pharmacokinetic parameters of volume of distribution and clearance, as well as how these alterations may influence dosing. Vancomycin and other drugs with activity against Gram-positive aerobes. General spectrum of activity of vancomycin, quinupristin-dalfopristin, linezolid and daptomycin, indications, mechanism of action, adverse effects and contraindications, mechanism of resistance to the drugs, major pharmacokinetic characteristics including bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in renal insufficiency and removal by haemodialysis. Tetracyclines and sulphonamides. Spectrum of activity, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs, major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in end-organ dysfunction and removal by haemodialysis, potential therapeutic advantages of the glycylcycline antibiotics. Clindamycin and metronidazole. Spectrum of activity with emphasis on activity against anaerobes and Clostridium difficile, indications, mechanism of action, adverse effects, contraindications and major drug interactions, mechanism of resistance to the drugs, major pharmacokinetic differences in terms of oral bioavailability, half-life, dosing interval, CSF penetration, route of excretion, necessity of dosage adjustment in end-organ dysfunction and removal by haemodialysis.

Antimycobacterial drugs. Indications, mechanism of action, adverse effects and contraindications of the first line antituberculosis drugs, treatment principles in treating M. tuberculosis infection, therapeutic indications of rifampicin, mechanisms of primary and

secondary resistance in M. tuberculosis infection, reasons for resurgence of tuberculosis and ways to stop epidemic, major determinant outcome of treatment and ways to improve this basic pharmacology of drugs used in the treatment of leprosy (sulphones). Anti-parasitic drugs, distinction between protozoal and helminth infections, general approaches to therapy, general strategies and relevant drugs used to treat the following infections, malaria Amoebiasis, African Trypanosomiasis, American trypanosomiasis, Cryptosporidiosis and Toxoplasmosis. General strategies and relevant drugs used to treat major helminth infections. Principal indications, mechanism of action, adverse effects and contraindications of the major drugs used in treatment of protozoal and helminth infections. Malaria. Chloroquine, diamino pyrimidines, proguanil, primaquine, quinine and quinidine, artemisinins, antibiotics. Amoebiasis, metronidazole, emetine, dihydroemetine, iodoquinol, paromycin, amoebic liver abscess. Trypanosomiasis. Suramin, melarsoprol, melarsonyl, nifurtimox, benznidazole. Cryptosporidiosis, nitazoxanide. Toxoplasmosis, pyrimethamine, folinic acid, sulfadiazine, clindamycin. Schistosomiasis and paragonimiasis. Niridazole, antimony compounds, bithionol. Leishmaniasis, Sodium stibogluconate, pentamidine. Filariasis, diethylcarbamazine. Tapeworms, niclosamide. Roundworms, piperazine, thiabendazole, tetrachlorethylene, mebendazole. Antimycotic drugs Indications, mechanism of actions, adverse effects and contraindications of the most commonly used drugs; polyene antifungals (amphotericin B, nystatin), azole antifungals (imidazoles such as miconazole, clotrimazole and ketoconazole, triazoles such as fluconazole and itraconazole), echinocandins (caspofungin, micafungin and anidofungin) and others such as 5-flucytosine, griseofulvin and terbinafine. Antiviral Drugs. Mechanism of action of major nucleoside and non-nucleoside analogues. Viruses targeted by the major nucleoside and non-nucleoside analogues and the relative benefits of each drug. Indications, mechanism of action and clinical efficacy of inhibitors of viral entry or dissemination. Mechanism of action leading to antiviral resistance. How drugs targeting different stages of viral infection can be synergistic when administered simultaneously. Nucleoside analogues (acyclovir, ganciclovir, idoxuridine, vidarabine, azidothymidine, dideoxy inosine, dideoxy cytosine). Non-nucleoside analogues (ribavirin, foscarnet), inhibitors of viral entry and dissemination (amantadine, neuraminidase inhibitors, pieconoril, interferons, passive antibody transfer). Antiretroviral drugs. How distinct antiretroviral drug classes target the different phases of HIV replication cycle, diagnostic criteria and therapeutic goals, indications, clinical uses, major adverse effects, contraindications and significant drug interactions for each class, utility and effectiveness of combination therapy, influence of presence of co-morbid conditions on antiviral regimen; nucleoside/nucleotide reverse transcriptase inhibitors, non-nucleotide reverse transcriptase inhibitors, protease inhibitors, viral integrase inhibitors, fusion inhibitors and chemokine receptor antagonists. Drugs used in treatment of malignant diseases. Major features of malignant disease. Review of cell kinetics, cell cycle specificity, cell cycle non- specificity. Cancer cell vs. bacterial infections. Importance of tumour cell heterogeneity and the development of resistance to chemotherapy as critical factors in determining treatment outcome. Process of antineoplastic drug development. Criteria for determining response to antineoplastic drugs. Importance of tumour staging in patient management. General principles of antineoplastic drug treatment. Rationale for administration of adjuvant chemotherapy. Concept of multiple drug-resistance, cumulative toxicity, schedule independent toxicity, concept of hormonally sensitive neoplasms and their treatments. Pharmacology of cytotoxic drugs. Characteristic indications, adverse effects, mechanism of resistance. Alkylating drugs (mechlorethamine, cyclophosphamide, chlorambucil, melphalan, busulfan). Antibiotics (Actinomycin D, Daunorubicin, Anthracycline mithramycin, Adriamycin), Antimetabolites (methotrexate, cytarabine, 5-flurouracil), Miscellaneous (procarbazine, nitroureas, hydroxyureas). Radioactive isotopes. Adrenal corticosteroids. Steroid hormones and antagonists. Drugs for immunotherapy.

MIC 402: Medical Virology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe viral families of medical importance and diseases caused by each member;
2. identify methods of diagnosis of viral diseases; and
3. describe ways by which viral diseases are treated and prevented.

Course Contents
DNA/RNA viral families, members and diseases caused. Influenza, poliomyelitis, smallpox, measles, yellow fever, Lassa fever, mumps, rubella, dengue, Herpes I and II, Hepatitis B and C, Ebola. HIV and SARS-COV-2/CORONA Viruses and other viruses of public health interest. Diagnostic tests such as serological and molecular techniques, ELISA and PCR. Complement fixation test (CFT), neutralisation test (NT), haemagglutination test (HAT). Cytopathic effect (CPE) in tissue cultures. Chemotherapeutic agents, vaccines available for the treatment and prevention of viral diseases as well as other preventive procedures available.

MIC 404: Medical Entomology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. define medical entomology;
2. list common arthropod vectors of infective agents of medical importance; and
3. apply knowledge of medical entomology in clinics.

Course Contents
Introduction to Medical entomology. Common arthropod vectors of infective agents of medical importance. Practical entomology.

MIC 406: Medical Protozoology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. describe structure, life cycle and identification of listed and provided protozoa;
2. demonstrate thin and thick films;
3. illustrate staining techniques, Giemsa, Wrights, Field's and Leishman's Stains; and
4. conduct wet 'mounts and identification of trophozoites, Cysts of E. histolytica, Giardia, Trichomonas, B. coli.

Course Contents
Structure, life cycle and identification of the following protozoa, Plasmodium spp. Toxoplasma gondii, Asospora horninis and belli Entaemoeba histolytica and gingivitis, Opportunistic pathogenic Amoeba, Non-pathogenic Amoeba, Giardia intestinalis, Trichomonas spp. Chilomatix mesnilli, Balantidium coli, Trypanasoma spp. Leishmania spp. Practical Protozoology. Thin and thick films. Staining techniques, Giemsa, Wrights, Field's and Leishman's Stains. Wet 'mounts and identification of trophozoites, Cysts of E. histolytica, Giardia, Trichomonas, B. coli.

MIC 408: Medical Helminthology (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:

1. describe some listed and provided helminthes;
2. discuss wet mounts from stool/urine/sputum;
3. demonstrate thin and thick films for identification of microfilaria;
4. demonstrate skin snips; and
5. identify helminthes from tissue biopsy.

Course Contents
Description and identification of the following Helminthes. Schistosoma spp. Paragonimus westermanii, Fasciolopsis buski, Metagoninus yokogawai, Heterophyes heterophyes, Dicrocoelium hospes, Taenia spp. Echinococcus granulosus, Hymenolepsis nana, Diphylobothrium latun, Ascaris lumricoides, Strongyloides stercoralis, Ancylostoma duodenanale, Necator americanus, Enterobius vermicularis, Trichuris trichiura, Wuchereria bancrofti, Loa, loa, Brugia malayi, Dracunculus medinensis, Onchocerca volvulus, Trichinella spiralis. Practical Helminthology. Wet mounts from stool/urine/sputum. Thin and thick films for identification of microfilaria. Skin snips. Identification of Helminthes from tissue biopsy.

MIC 410: Microbial Genetics (1 Unit C: LH 15)

Learning Outcomes
At the end of this course, students should be able to:
1. identify bacterial genetic materials;
2. define genetic code;
3. explain transcription and translation;
4. discuss mechanism of gene transfer via transformation, transduction and conjugation;
5. describe genetic basis of variation and define bacteriophages; and
6. explain genetic basis of drug resistance.

Course Contents
Definition of terms, bacterial genetic materials. Genetic Code. Transcription and translation. Mechanism of gene transfer. Transformation. Transduction. Conjugation. Genetic basis of variation. Bacteriophages. Genetic basis of drug resistance.

CPY 402: Clinical Nutrition and Nutritional Support (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate the physiologic function and consequences of deficiencies or excesses of various macro, and micronutrients and trace elements;
2. explain biochemical functions of lipid and water-soluble vitamins and describe coenzyme structure and function;
3. enumerate indications of enteral and parenteral nutritional support and discuss complications of various forms of nutritional support; and
4. describe role of chemical pathology laboratory in the diagnosis, monitoring of nutritional disorders and nutritional support.

Course Contents
Nutritional requirements and nutritional disorders. Biochemical functions of micronutrients and trace elements. Lipid soluble vitamins. Water soluble vitamins. Coenzyme structure and functions, biochemical investigations of various micronutrients associated disorders. Nutritional support in clinical medicine, indications of enteral and parenteral nutritional support, complications of various forms of nutritional support. Role of chemical pathology laboratory in the diagnosis and monitoring of nutritional disorders and nutritional support.

CPY 404: Clinical Enzymology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate types of plasma enzymes;
2. define inborn errors of metabolism and discuss the various inborn errors of metabolism;
3. explain the sources and uses in interpretation of results obtained by analysis of plasma enzymes;
4. list non-pathologic causes of elevation of selected plasma enzymes; and
5. describe overview and consequences of the management of common inborn errors of metabolism.

Course Contents
Plasma enzymes, transaminases, alkaline and acid phosphatases, creatine kinase, lactic dehydrogenases and their uses in diagnosis and management of various diseases. Interpretation of enzyme levels in various diseases. Non-pathologic causes of elevation of selected plasma enzymes. Inborn errors of metabolism, definition, causes, consequences, and an overview of the management of common inborn errors of metabolism. Galactosaemia, lactose intolerance, albinism, aminoaciduria, phenylketonuria.

HAE 402: Blood Transfusion and Transplantation (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. list indications for blood transfusion and explain methods of blood storage, anticoagulants and shelf-lives;
2. describe blood component preparation, indications, and rational use of blood;
3. list steps of compatibility testing, bedside transfusion checks, and complications of blood transfusion;
4. enumerate the various types of blood donors with their merits and demerits and explain the donor selection criteria; and
5. describe the process of blood collection and screening and enumerate the recommended mandatory TTIs screened for in Nigeria.

Course Contents
Introduction to red blood cell serology. Antigens and antibodies of ABO and Rh blood group systems, haemolytic diseases of foetus and newborn. Blood donation. Donor recruitment including criteria for acceptance and deferrals for allogenic blood donors. Blood collection and screening for TTIs including HIV–screening and window period. Clinical blood transfusion. Indications for blood transfusionn, blood storage, blood fractionation and component therapy, rational use of blood, blood compatibility testing, bedside pre-transfusion check. Complications of blood transfusion and management. Immediate, delayed, immunological and non-immunological.

HAE 404: Practical and Interpretative Haematology (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe how to correctly fill the relevant request forms in haematology and blood transfusion;
2. explain specimen collection, types of specimen bottles and anticoagulants used in haematology and blood transfusion;

3. explain interpretation of common haematological tests, and technique, indications and complications of bone marrow examination;
4. describe competence and skills in performing common haematological tests and identification of common haematology laboratory equipment including their uses;
5. explain principles and interpretation of haemoglobin electrophoresis, sickling;
6. describe solubility tests and HPLC for Hb genotyping;
7. list indications, technique and complications of bone marrow aspiration cytology and trephine biopsy; and
8. demonstrate equipment used in haematology diagnostic laboratory.

Course Contents
Filling haematology and blood transfusion request forms. Specimen handling, transportation and processing. Types of specimen bottles and anticoagulants used in haematology and blood transfusion. Interpretation of common haematological tests. Full blood count, clotting profile including INR, ABO and Rh blood grouping. Direct and indirect Coomb's test. Analytical procedures. Principles of haemoglobin and haematocrit estimation, blood films and staining WBC and platelet counts. Film of SS and SC patients, film of iron-deficiency and megaloblastic anaemia. E.S.R. estimation. Tests for thrombin time, PT/INR/PTTK estimation of fibrin degradation products. Principles and interpretation of haemoglobin electrophoresis, sickling and solubility tests and HPLC for Hb genotyping. Indications, technique and complications of bone marrow aspiration cytology and trephine biopsy. Demonstration of equipment used in haematology diagnostic laboratory.

500 Level

GDS 501: Local Anaesthesia in Dentistry (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the historical, anatomical and physiological aspects of local anaesthesia in dentistry;
2. identify and utilise the various armamentaria used in achieving local anaesthesia;
3. enumerate the various techniques for anesthetising oral tissues;
4. describe the complications of local anaesthesia and their mechanism; and
5. demonstrate local anaesthesia in upper and lower teeth.

Course Contents
Introduction to local anaesthesia, history, theories, management of pain and applied surgical anatomy. Local anaesthesia, advantages, disadvantages, and the armamentarium
the local anaesthetic. Classification, mechanism of action and properties, complications of local anaesthesia. Introduction, history of anaesthesia, theories, management of pain, clinical demonstration of cartridge loading and handling of the dental syringe including dental chair. Patient and clinician's positioning during local anaesthesia administration. Effectiveness of local anaesthesia infiltration.

GDS 503: Introduction to Clerkship in Dentistry (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the nuances and commonly used terms in dentistry;
2. discuss the roles and expectations of a dentist, including clinical, academic and ethical; and

3. identify commonly used equipment, instruments and some procedures in which they are used.

Course Contents
History and state of dentistry in Nigeria and the relevance of dentistry to health in Nigeria. Different practice options in dentistry, private, government and group practices. Different specialties in dentistry. Exposure to different dental operatories, types, equipment, rationale and staffing. Discuss principles of clerkship and the deductive process by which diagnoses are made. Ethical principles of dentistry, the future of a dentist, tooth notations in dentistry, common terms in dentistry, introduction to the dental operatory and the dental laboratories. Manpower types in dentistry. Nuances in different specialties. Orthodontics (ortho). Paediatric dentistry (Paedo). Oral and maxillofacial surgery (OMFS). Periodontology (Perio). Restorative dentistry (CONS/PROS). Prognostication in dentistry (ODS, CONS).

ORP 501: Introductory Oral and Maxillofacial Pathology/Pathological Aspects of Oral Disease (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. recognise the macroscopic and microscopic features of normal tissues and the pathological basis of diseases;
2. identify aspects of normal oral biology and pathophysiology that are relevant to the practice of oral and maxillofacial pathology;
3. identify principles of fixation of tissues and tissue processing procedures;
4. describe principles of advanced diagnostic techniques for example, immunohistochemistry, immunofluorescence and the uses of these techniques;
5. apply clinical knowledge to formulate clinicopathological correlations; and
6. diagnose basic histopathological changes in biopsies.

Course Contents
History of microscope. Types and components of a microscope. Principle and specialised microscopy techniques. Microscopy tissue processing. Introduction to advanced diagnostic techniques. Review of embryogenesis and odontogenesis. Terminologies in oral pathology. Histo-techniques. Tooth and craniofacial anomalies. Benign lesions of the oral cavity. Malignant lesions of the oral cavity. Benign and malignant lesions of salivary glands. Cysts of the oral and maxillofacial region. Benign tumors of odontogenic origin. Malignant tumors of odontogenic origin.

ORP 503: Systemic Diseases of the Jaws (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. identify heterogeneous group of disorders with oral components or strictly oral manifestations;
2. explain basic histopathological changes in the systems which may equally be manifested in the oral cavity components; and
3. list the investigative aspects of biochemistry and medical genetics that are relevant to the diagnoses.

Course Contents
Benign bone pathologies. Diseases of the blood and blood-forming organs. Diseases of the skin. Diseases of the nerves.

ORP 505: Syndromes and Diseases of Specific Systems/Practical and Surgical Oral Pathology (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss syndromes of the orofacial region;
2. identify specific features that comprises each of the orofacial syndromes;
3. explain basic comprehension of the molecular basis and etiologies;
4. identify the complications and prognosis of each syndrome with their therapeutic modalities;
5. identify diseases associated with the tongue and lips;
6. discuss the steps involved in preparing the specimen for microscopy; and
7. explain basic prophylaxis on all kinds of patients.

Course Contents
Causes and clinical approach to syndromes. Syndromes associated with the defects in the mandible and maxilla. Syndromes associated with connective tissue pathologies. Specific diseases of the tongue. Specific diseases of the lips.

ORM 501: Introduction to Oral Medicine and Pharmacotherapy in Oral Medicine Practice (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the basic principles of patient management and interaction in oral medicine;
2. describe the various modalities of diagnosing oral lesions in dentistry;
3. explain the basic principles of drug use in dentistry; and
4. describe and discuss the uses, effects and interactions of drugs used in dentistry.

Course Contents
Commonly used terms and conditions in oral medicine and their clinical applications. History taking. Examination. Investigations. Informed consent and pharmacokinetics, pharmacodynamics. Routes of drug administration. Adverse drug reactions and drug interactions. Proper prescription writing. Drug properties and dosages. Proper use of antibiotics, classifications, modes of action, and dosages. Referral in oral medicine.

ORM 503: Dental Management Considerations in Patients with Systemic Disorders and Clinical Oral Medicine (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the considerations while managing patients with systemic co-morbidities;
2. describe management of the medically compromised patient;
3. identify common oral lesions and oral manifestations of systemic disorders; and
4. manage common medical emergencies in the dental clinic.

Course Contents
General principles of care in the medically compromised patient. Dental management considerations in patients with systemic disorders. Dental management considerations in patients with cardiovascular diseases. Endocrine disorders. Neuromuscular disorders. Gastrointestinal disorders. Renal disorders. Respiratory disorders. Bleeding disorders and immunodiagnostic. Treatment planning and management of patients with various oral

medicine disorders clinic including those with systemic co-morbidities or reactions to pharmaco-therapeutic treatment. Management of patients with systemic conditions. Management of medical emergencies in the dental clinic.

PED 501: Introduction to Paediatric Dentistry and Behavioural Management (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. recognise developmental milestones;
2. describe the eruption sequence;
3. discuss the differences between the adult and primary dentition;
4. identify the various methods of promoting positive behavior in children; and
5. explain other methods of managing behaviour in children.

Course Contents
General and dental developmental milestones in children, and the differences between management in the adult and in the child. Eruption of teeth, and the difference between the adult and child dentition. Principles of child psychology, non-pharmacological and pharmacological options for behavior management and pain control. Introduction to paediatric dentistry. Milestones in child development. Development of the dentition. Review of clerkship with bias to paediatric dentistry. Child psychology. Pain control for children. Non-pharmacological management. Pharmacological management.

PED 503: Clinical and Practical Paediatric Dentistry (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. identify teeth based on their morphological characteristics;
2. practice isolation techniques and cavity preparation using available aids and devices for restoration;
3. conduct pulp treatment;
4. place stainless steel crowns; and
5. identify materials used for dental arch space management.

Course Contents
Oral diagnostics. Dental therapeutics. Identification of teeth. Placement of rubber dam. Identification and placement of matrix. Band, retainers and wedges. Principles of cavity preparation. Cavity preparation including class I and II cavities. Stainless steel crown preparations and placement on anterior and posterior teeth. Veneers, space maintainers, acid-etch technique, pulp therapy including indirect and direct pulp therapy. Pulpotomy. Pulpectomy.

ORT 501: Introductory Orthodontics (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. define orthodontics and discuss its history and scope;
2. describe the growth of facial skeleton and its relevance;
3. discuss the development of occlusion, eruption and normal oral function, and relate it to the aetiology and health risks associated with malocclusion; and
4. list and describe the use of common indices used in orthodontics.

Course Contents
History, definition and scope of orthodontics. Normal development of occlusion and oral function. Growth of facial skeleton, including theories of facial growth, classification, aetiology, epidemiology, and health risks associated with malocclusion. Malposition of teeth and mal-relation of arches. Introduction to orthodontics, development and growth of facial skeleton, eruption of teeth, occlusion and oral function, malocclusion in the early and late dentition stages. Principles of space analysis, health risks associated with malocclusion, classifications of malocclusion and indices used in orthodontics. Principles of orthodontics. Tooth movement including different types of tooth movement. Review of clerkship, with emphasis on clerking of an orthodontic patient.

ORT 503: Applied Orthodontics (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. list and describe common oral habits and the rationale and options for their management;
2. describe the role of orthodontics in the management of patients with unerupted canines, clefts;
3. enumerate the challenges and intricacies of adult orthodontics;
4. describe the role of wisdom teeth in orthodontics; and
5. list and explain the deleterious effects of orthodontic treatment.

Course Contents
Management of oral habits. Orthodontic management of cleft patients. Orthodontic management of unerupted canine. Wisdom teeth and their role in orthodontics. Orthodontic management of adult/adolescent patients. Role of orthodontists in management of the orthognathic surgery patient. Deleterious effects of orthodontic treatment.

ORP 502: Infections of the Oral Cavity (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the basics of clinical microbiology as it pertains to oral pathology;
2. describe the pathogenesis and oral manifestations of common bacterial, viral and mycotic infections of the oral cavity;
3. outline their investigative tools (including serology) and their histopathological features;
4. describe the anatomy of the healthy periodontium;
5. outline local and systemic factors associated with periodontal diseases;
6. explain the etiology and histopathology of dental caries; and
7. discuss the classification, etiology, clinical features and management of osteomyelitis.

Course Contents
Bacterial infections of the oral cavity. Viral infections of the oral cavity. Mycotic infections of the oral cavity. Diseases of the periodontium. Dental caries. Pulpal diseases, and periapical tissues. Spread of oral infections.

ORM 502: Oral Diseases and Orofacial Pain/Temporomandibular Disorders (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. diagnose and manage common oral lesions in dentistry;

2. describe the pain pathway, and the pathophysiology of pain, and its application to dentistry;
3. manage pain in the dental practice; and
4. describe and discuss the management of temporomandibular joint disorders.

Course Contents
Ulcerative and vesiculo-bullous lesions. White and red lesions. Benign soft and hard tissue lesions of the oral cavity. Disorders of pigmentation. Oral pre-malignant and malignant lesions. Oro-facial complications of non-surgical cancer therapy. Salivary gland disorders. Pain definition and concepts. Pain pathway and patho-physiology. Neuropathic pain disorders. Anatomy and function of the temporomandibular joint. Temporomandibular joint disorders.

ORY 502: Foundations of Radiology (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the nature of radiation and the components of the x-ray machine;
2. explain the interactions of x-rays with matter and appropriate doses of x-rays;
3. enumerate the direct and indirect effects of x-rays on cells, tissues and organs;
4. design appropriate dose exposure risks mechanism;
5. identify processing solutions and their individual functions;
6. list the steps of manual film processing; and
7. describe the parameters of image sharpness and resolution.

Course Contents
Composition of matter and nature of radiation. Radiation chemistry including deterministic and stochastic effects. Sources of radiation exposure. Dose limits and reducing radiation exposure. Components of the x-ray machine and factors controlling the ray beam. Dosimetry, x-ray films and processing solutions. Darkroom equipment and manual/automatic film processing, knowledge of the basic physics and principles of radiology, knowledge of the effect of radiation on biologic tissues. Knowledge of the safety precautions and protection guidelines in x-rays usage. Knowledge of the x-ray machine and the beam it produces.
Knowledge of the darkroom and processing solutions.

ORY 504: Intra-Oral and Extra-Oral and Specialised Radiographic Techniques (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe paralleling and bisecting techniques;
2. describe the technique of periapical and occlusal imaging;
3. interpret both periapical and occlusal radiograph and be able to outline indications for extra-oral imaging and types of extra-oral imaging;
4. describe the techniques of different types of extra-oral imaging including panoramic imaging;
5. describe the basics and types of advanced imaging modalities; and
6. enumerate the indications and application of advanced imaging modalities.

Course Contents
Projection geometry. Principles and techniques of periapical imaging. Types and technique of occlusal imaging. Special considerations in intraoral imaging. Intraoral anatomy and interpretations of intraoral radiography. Selection criteria and techniques of extra-oral imaging.

Evaluation of extra-oral imaging. Principles of panoramic imaging, interpretation of panoramic imaging. Introduction to advanced imaging modalities. Indications and applications of advanced imaging modalities. Knowledge of the techniques of periapical and occlusal imaging. How to interpret intraoral imaging. Knowledge of techniques of extra-oral imaging. knowledge of panoramic imaging interpretation. Introduction to basics and physics of advanced imaging modalities. Knowledge of the clinical uses of advanced imaging modalities.

ORY 506: Radiographic Interpretations and Practical Oral Radiology (3 Units C: LH 15; PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. identify the criteria of a good radiograph;
2. discuss the relevant anatomy and important landmarks in order to identify presence of pathologies or deviation from normal;
3. explain the role of imaging as a diagnostic caries aid, and in detection of periodontal disease;
4. identify peculiar/generalised imaging characteristics to arrive at a diagnosis for pathologies of the TMJ, salivary gland and paranasal sinuses;
5. discuss simple intra-oral and extra-oral views in dentistry;
6. read and report common radiographs used in dental practice; and
7. identify anatomic landmarks in intraoral and extraoral radiographs.

Course Contents

Description of adequate diagnostic images and analysis of abnormal findings. Steps in analysis of intraosseous lesions. Radiology in detection of dental caries, and alternate diagnostic tools. Radiology in periodontal diseases detection and therapy. Imaging features of cysts and benign tumours. Imaging features of other bone diseases. Imaging features of malignant diseases. Imaging features of salivary gland diseases. Imaging features of paranasal sinuses and TMJ diseases. Imaging features of dental and craniofacial anomalies.

PED 502: Pulp Therapy and Prevention in Paediatric Dentistry (3 Units C: LH 15; PH 90)

Learning Outcomes

At the end of this course, students should be able to:

1. recognise symptoms of pulp diseases and accurately diagnose them;
2. draw up appropriate treatment plans;
3. perform simple pulpal treatments;
4. identify and fabricate simple space maintainers; and
5. discuss the definition, aetiology and risk factors for dental caries, and the means by which conditions are prevented.

Course Contents

Considerations during treatment of primary teeth. Treatment options for primary and young permanent teeth. Indications for extraction and types of space maintainers and space retainers. Caries as an environmental disease and its impact on prevention of caries. Role of oral hygiene, diet, fluoride and new restorative materials in the prevention of caries. Risk assessment in the management and prevention of dental caries. Prevention of other conditions in paediatric dentistry (trauma to teeth, medical emergencies.). Dental therapeutics, exodontia in primary and young permanent teeth, pulp therapy including in direct and direct pulp capping. Pulpotomy, pulpectomy, apexification and apexogenesis. Trauma management. Management

of space problems. Prevention of dental caries in the child, oral hygiene, diet. Prevention of caries, fluoride and restorative materials. Risk assessment in dentistry. Medical emergencies.

PED 506: Hard and Soft Tissue Disorders/Craniofacial Anomalies (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. relate the development of the dentition to the process of eruption; and
2. relate the development of the dentition to the aetiology of structural abnormalities and occlusal problems.

Course Contents
Soft tissue disorders. Hard tissue disorders at different stages of dental development, considerations in the dental management of disorders and anomalies including cleft lip and palate, oral soft tissue lesions and anomalies in children. Dental anomalies including, eruption and exfoliation disorders. Disorders of tooth number, size and form or shape. Disorders of tooth structure. Common occlusal problems during tooth exchange.

ORT 502: Investigations, Diagnosis and Treatment Planning in Orthodontics (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. take history and examine an orthodontic patient;
2. appreciate the rationale for each step;
3. identify, discuss the indications for, and describe the various radiographic and non-radiographic investigations in orthodontics and dentofacial orthopaedics;
4. describe the different classes of malocclusion; and
5. explain the basic principles of management of the various classes of malocclusion.

Course Contents
Examination of an orthodontic patient. Assessment of crowding and space analysis. Methods of investigating/assessing soft tissue form and function. Radiology for orthodontics. Orthodontic treatment plan for angle's class I, class II division 1, class II division 2, class III. Malocclusions, their features and treatment be able to sequentially and exhaustively take history and examine an orthodontic patient and discuss the rationale for each step.

ORT 504: Orthodontic Treatment Options (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the physiology of tooth movement;
2. list sequentially and describe the rationale for steps in interceptive orthodontics and serial extraction;
3. list various removable appliances, their components, and describe a few in detail;
4. list various functional appliances, their components, and describe a few in detail;
5. list various modalities of fixed appliance therapy, and describe its components and principles in detail; and
6. select the appropriate treatment options for an orthodontic patient.

Course Contents
Physiology of tooth movement. Interceptive orthodontics. Serial extraction. Removable appliances. Functional appliances. Fixed appliances. Current concepts in orthodontics.

ORT 506: Clinical and Practical Orthodontics (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the different gauges of wires used in orthodontics and their indications;
2. identify and use different orthodontic instruments to fabricate indicated appliance components; and
3. demonstrate steps involved in management of various orthodontic conditions.

Course Contents
Materials used in orthodontics, including wires of different gauges. Instruments and consumables used for fabricating appliances. Practical fabrication of appliances and wire bending for appliances including adam's clasp, labial bow, single cantilever spring, double cantilever spring, C-clasp, and W-wire. Clinical management of patients with various orthodontic complaints including serial extractions, removable appliances.

600 Level

CON 601: Theoretical Basis of Endodontics (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the anatomic and patho-physiologic rationale of endodontic treatment;
2. appreciate the scope and methods of endodontic treatment; and
3. discuss the endodontic options for management of traumatised or discoloured teeth.

Course Contents
Treatment planning. Case selection, and prognostication in endodontic therapy, including management of related conditions. Review of clerkship with emphasis on clerking in the conservative clinic. Endodontic periodontal relationships. Pulp capping. Basic principles of endodontics. Patient assessment. Diagnosis and treatment planning in endodontics. Root canal therapy, considerations and rationale, management of traumatic dental injuries management of discoloured teeth.

CON 603: Endodontics (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the different types of access cavities for different types of teeth;
2. explain the role and methods of radiography in endodontic procedures;
3. manage endodontically treated tooth; and
4. appreciate the modifications to treatment when dealing with deciduous and immature permanent teeth.

Course Contents
Materials and steps in root canal treatment. The access cavity. Instrumentation. Working length determination. Obturation. Restoration of endodontically treated teeth. Endodontic surgery. Endodontic considerations for deciduous and immature permanent teeth.

CON 605: Theoretical Basis of Advanced Conservation (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. make diagnosis, risk assessment and management approaches.
2. discuss principles of tooth preparation and minimum intervention dentistry; and
3. design cavities for various restorations.

Course Contents
Principles of occlusion and articulation in fixed prosthodontic practice. Complex cavities and restoration techniques. The fixed partial denture. The post and core restoration. Resin-bonded bridges and fibre reinforced resin-bonded bridges. Managing the patient with deranged occlusion. Basic implantology.

CON 607: Advanced Conservation (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. provide a theoretical framework for the fabrication of extra-coronal restorations;
2. provide a cognitive background for the procedures and processes necessary in providing such restorations;
3. appreciate the concept of deranged occlusion and the procedures available for remedying same; and
4. discuss the restorative parts of implantology.

Course Contents
Tooth preparation. Impression making and moisture control. The temporary restoration. Preparation of working casts and dies. Casting and causes of casting failure. Cementation and post insertion management.

PRO 601: Complete Dentures (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. link the knowledge from prosthetic technique to the more clinically complex aspects of complete denture practice;
2. appreciate the peculiarities of elderly patients who usually require complete dentures;
3. explain techniques for optimising the fractured, worn or otherwise damaged complete dentures; and
4. discuss recent advances in complete denture prescription.

Course Contents
Review of prosthetic techniques. Review of clerkship, with emphasis on clerking the prosthodontic patient. The elderly edentulous patient. Assessment of the complete denture patient. Delivery and review appointments. Repair, reline and rebase of complete dentures. Difficult situations with complete dentures. Implant supported complete dentures. Overdentures.

PRO 603: Partial Dentures (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:

1. appreciate rationale for making denture frameworks from metal;
2. enumerate materials available for the fabrication of denture bases/frameworks;
3. discuss effects of partial dentures on periodontal health;
4. enumerate components of a metal framework partial denture;
5. discuss the design process and fabrication of metal framework partial dentures; and
6. appreciate the rationale for acrylic based partial dentures that are relatively healthy for the periodontium.

Course Contents
Introduction to partial dentures. Classification of edentulous spaces. Components of metallic denture frameworks. Surveyors and surveying. The design process. Laboratory stages in partial denture fabrication. Problems with denture classes. Special partial dentures.

PRO 605: Specialised Prostheses and Implants (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. provide a brief overview of maxillofacial prosthodontics and gnathology with information tailored towards an undergraduate level of training; and
2. explain the fabrication of occlusal appliances.

Course Contents
Introduction to maxillofacial prostheses. Managing temporomandibular disorders. Implants in maxillofacial prosthetics.

GDS 601: Practice Management (2 Units C: LH 15; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. explain the importance of the patient in the management of a practice, and the concepts in contemporary dentistry that emanate from this concept;
2. discuss considerations in operating a private and public dental practice, including space, resources, manpower, recent trends;
3. describe the role of quality assurance and improvement in dentistry; and
4. apply principles of leadership and management to dentistry in private or public settings.

Course Contents
Administration, team organisation, and leadership in healthcare. Financial literacy. Record keeping and computers in dentistry. Patient-centred and evidence-based dentistry. Quadrant- and four-handed dentistry. Quality improvement in dentistry.

GDS 602: Gerodontology (2 Units C: LH 15, PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define and discuss the concept of oral health promotion, its components, and their principles;
2. discuss the importance of, and apply both concepts to the improvement of population oral health; and
3. identify the rationale for dental education, and discuss new concepts designed to foster life-long learning.

Course Contents
Introduction to gerodontology. Ageing in dentistry. Medical, drug and social considerations in geriatric oral health. Management of oral diseases in the elderly (treatment planning, modalities and modifications, treatment facility, equipment and services). Dental care for the terminally ill patient. Prevention of oral diseases in the elderly.

GDS 603: Ethics and Jurisprudence (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. define and discuss the basic ethical principles of patient management and research; and
2. link and distinguish between the various ethical concepts.

Course Contents
Ethics and jurisprudence, definition and scope. Ethical issues in dentistry. Oath of Hippocrates. Dental malpractice and negligence. Ethical issues in research.

OMS 601: Introduction to Oral and Maxillofacial Surgery Exodontia in Mature Permanent Teeth (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate the rationale and know the principles of minor oral surgery;
2. identify principles of interalveolar and trans alveolar exodontia;
3. list the steps involved in interalveolar and trans alveolar exodontia; and
4. discuss complications of exodontia and their management principles of minor oral.

Course Contents
Wound healing, soft and hard tissues. Systemic conditions of importance to the oral and maxillofacial surgeon. Review of clerkship, with a bias to oral and maxillofacial surgery. Pre-operative assessment of the maxillofacial patient. Principles of minor oral surgery. Asepsis, aseptic techniques and sterilisation in oral and maxillofacial surgery. Clinical investigations in oral and maxillofacial surgery. Review of local anaesthesia in dentistry. Introduction to exodontia indications and contraindications for tooth extraction. Pre-operative assessment in intra-alveolar/trans alveolar extractions. Intra-alveolar exodontia. Trans-alveolar exodontia. Complications of extraction and management. Surgery including vision. Access preoperative patient assessment in exodontias. Principles and complications of tooth extractions.

OMS 603: Maxillofacial Traumatology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. appreciate the principles of emergency patient care in the event of trauma;
2. recognise the signs and symptoms of facial fractures;
3. interpret investigation results in the treatment of facial fractures;
4. identify indications and contraindications of closed and open reductions in the treatment of facial fractures; and
5. describe the principles of treatment of facial fractures.

Course Contents

Principles of management of the trauma patient and maxillofacial emergencies. Management of soft tissue injuries. Management of mandibular fractures. Management of fractures of the middle third of the skeleton. Complications of facial fractures and their treatments. Triage, basic life and advanced trauma life support and care. Glasgow coma scale, oral and maxillofacial emergencies. Haemorrhage in oral and maxillofacial surgery. Classification and signs and symptoms of mandibular fractures. Mid-facial fractures. Investigations in the management of facial fractures. Principles of treatment of mandibular fractures. Indications and contraindications of open and closed reduction. Indications for and principles of treatment of lefort, zygomatic, alveolar and pan facial fractures. Condylar fractures. Classification, open vs closed reduction. Peculiarities and treatment of facial fractures on children and the elderly.

OMS 605: Infections of the Mouth and Jaws (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. investigate and diagnose oro-facial infections; and
2. describe the basic principles of treatments of oro-facial infections.

Course Contents
Fascial spaces and routes of spread. Principles of infection management and antibiotic therapy. Iodontogenic infections and their management. Non-odontogenic infections of soft tissue and their management. Hard tissue infections and their management. Salivary gland infections and their management. Atypical infections of the head and neck and their management. Immune suppression and head and neck infections.

OMS 607: Oral Oncology (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. investigate and diagnose oral lesions;
2. differentiate between benign and malignant oral lesions; and
3. discuss the basic principles of maxillofacial reconstructive surgery.

Course Contents
Cysts of the jaws. Benign odontogenic swellings. Benign non-odontogenic swellings, carcinomas, sarcomas. Maxillofacial reconstruction and tissue transplantation. Recent advances in reconstructive surgery.

OMS 609: Surgical Management of Congenital and Cranio-Facial Pathologies (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. identify and provide differentials for congenital oro-facial swellings;
2. explain the role of different specialties in the management of cleft lip and palate;
3. perform parental counselling in the event of cleft lip and palate in a newborn; and
4. discuss the surgical procedure for prosthetic and orthodontic reasons.

Course Contents
Differential diagnosis of congenital swellings of the oro-facial region. Clefts, associated syndromes, and its management. Vascular and lymphatic lesions of the oro-facial region and

their management. Other syndromes and anomaliesj of importance in dentistry. Pre-prosthetic surgery and implantology. Surgical orthodontics.

OMS 611: Diagnosis and Management of TMJ/Neurological Disorders (2 Units C: LH 30)

Learning Outcomes
At the end of this course, students should be able to:
1. enumerate the predisposing/aetiological factors of TMJ disorders;
2. identify the various TMJ investigative modalities;
3. list the various surgical treatments appropriate for the management of TMJ disorders; and
4. discuss the aetiology and clinical features of various neurological disorders and their management.

Course Contents
Surgical and functional anatomy of the TMJ. TMJ disorders and their management. Neurological disorders in oral and maxillofacial surgery.

DPH 601: Introduction to Dental Public Health, Epidemiology and Biostatistics (3 Units C: LH 30; PH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the discipline of dental public health, its definitions, principles and aims;
2. explain the importance of the fields of epidemiology and biostatistics to dental public health; and
3. provide basic data on health states important to dentistry.

Course Contents
Introduction to public health and community dentistry. Introductory epidemiology. Basic statistics. Epidemiology of dental caries. Periodontal disease and oral cancer including measurement of oral diseases and sampling techniques.

CON 602: Clinical Conservative Dentistry (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. demonstrate steps in different restorative and endodontic treatments;
2. conduct case presentations; and
3. discuss patient management.

Course Contents
Isolation and moisture control techniques. Patient and operator positions. Cross infection control. Illumination and magnification. Basic instrumentation. Diagnosis of common dental, pulpal and peri-apical conditions. Treatment of common dental, pulpal and peri-apical conditions.

CON 604: Conservative Practicals (4 Units C: PH 180)

Learning Outcomes
At the end of this course, students should be able to:

1. acquire and improve manual skills for advanced conservation and endodontics; and
2. perform tooth preparation and impression techniques independently on mannequins.

Course Contents
Tooth preparation for full jacket crowns. Tooth preparation for inlays and onlays. Impression techniques for advanced conservation work. Programming a semi-adjustable articulator.

PRO 602: Clinical Prosthodontics (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. assess prosthetic patient; and
2. demonstrate management of the prosthetic patient.

Course Contents
Patient assessment. Impression procedures. Bite registration. Aesthetic try-in appointments. Delivery and post-delivery care. Management of problems with different classes of dentures.

PRO 604: Prosthodontic Practicals (2 Units C: PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. acquire manual skills for prosthodontics; and
2. improve manual skills for prosthodontics.

Course Contents
Fabrication of partial and complete acrylic complete and temporary partial dentures from impressions to review). Use of facebow and articulators in transferring and mounting records. Surveying casts and designing metal frameworks (performed). Casting of metal frameworks (observed). Fabrication of maxillary obturators (observed). Fabrication of occlusal appliances (observed). Filling out of laboratory request forms.

OMS 602: Oral and Maxillofacial Surgery Practicals, Clinicals and Theatre (4 Units C: PH 180)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss armamentarium of local anaesthesia in dental practice;
2. appreciate techniques of local anaesthesia in dentistry;
3. discuss instrumentation in exodontia;
4. demonstrate and practice exodontia;
5. enumerate principles and complications of tooth extractions;
6. discuss the layout and use of the theatre;
7. explain drugs and drug interactions in oral and maxillofacial surgery; and
8. enumerate properties of general anaesthetic drugs commonly used.

Course Contents
Preoperative patient assessment in exodontias. Infiltration and block techniques used in exodontias. Armamentarium and clinical demonstrations and practice of the principles of intra-alveolar forceps exodontias including haemorrhage control. Armamentarium, clinical demonstrations and practice of trans-alveolar exodontias. Management of post-extraction

bleeding and alveolar osteitis. The maxillofacial surgery theatre. Surgical instrumentation in oral and maxillofacial surgery. General anaesthesia in oral and maxillofacial surgery. History taking and clinical examination in oral and maxillofacial surgery. Systemic considerations in oral and maxillofacial surgery. Drugs and drug interactions in oral and maxillofacial surgery.

PDL 602: Introductory Periodontology (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss anatomy and physiology of the periodontium in health, including its relationship to other surrounding tissues and the occlusion;
2. identify and discuss the similarities and peculiarities between different tooth deposits;
3. identify and describe the different oral hygiene methods and materials, as well as their use; and
4. identify and describe the various oral hygiene indices in use.

Course Contents
Historical perspectives in periodontology. Periodontal anatomy and physiology and pulpal-periodontal relationships. Tooth deposits. Dental stains. Oral hygiene methods and products. Oral hygiene indices. Principles of occlusion and occlusal problems. Review of clerkship, with focus on clerking a periodontal patient.

PDL 604: Periodontal Pathophysiology (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss the anatomy of the periodontium in ill-health, and the patho-physiology and aetiology of the various broad groups of periodontal disease;
2. describe currently used classifications of periodontitis; and
3. identify specific acute and chronic periodontal conditions, measurement using periodontal indices, and discuss their management.

Course Contents
Aetio-pathogenesis of gingivitis and periodontitis. Immunology of periodontal disease. Systemic factors and periodontal disease. Plaque-induced and non-plaque induced gingival diseases. Old and new classifications of periodontitis. Acute periodontal lesions. Periodontal enlargements. Aggressive periodontitis. Gingival recession and dentine hypersensitivity. Periodontal-endodontic lesions furcation involvements. Periodontal and other indices.

PDL 606: Management of the Periodontal Patient (3 Units C: LH 15; PH 90)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the signs and symptoms of gingivitis and periodontitis and make diagnosis in the periodontology clinic;
2. draw up a comprehensive treatment plan and manage simple periodontal cases;
3. perform simple periodontal treatment procedures; and
4. identify and discuss considerations in the use of different chemotherapeutic options in periodontology.

Course Contents

Clinical features of gingivitis and periodontitis. The periodontal treatment plan, principles of treatment of a simple case. Simple periodontal instrumentation. Non-surgical periodontal procedures. Chair-side positioning for periodontal treatment. Periodontal chemotherapeutics. Signs and symptoms of conditions affecting the periodontium, and diagnosis of these conditions. Basics and important considerations in making the periodontal treatment plan. Simple periodontal treatment procedures and considerations in management, including chair and chair-side positioning. Instrumentation. Chemotherapeutics used in periodontology.

PDL 608: Operative and Clinical Periodontology (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. identify the instruments and materials used during and after periodontal surgical procedures, their constituents, and their properties;
2. describe the different means of achieving regeneration in periodontology;
3. list the features and management of occlusal traumatism;
4. discuss the types, uses, surgical procedure and management considerations in the use of implants;
5. discuss the meaning, importance of, and the means by which infection control can be achieved in the periodontology clinic in particular; and
6. Perform basic prophylaxis on all kinds of patients.

Course Contents
Complex periodontal treatment. Principles of periodontal surgery and biologic width. Instrumentation. Gingivectomy. Flap techniques. Periodontal dressings. Periodontal splints. Periodontal regenerative therapy. Occlusal trauma and occlusal adjustments. Implantology.

DPH 602: Prevention in Dentistry (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define and discuss the concept of prevention in oral health, and its principles;
2. link the concept of prevention to other concepts in dental public health;
3. apply the principles of prevention on health states important to dentistry, including caries, periodontitis, oral cancer; and
4. discuss the prevention of hazards in a dental practice.

Course Contents
Levels and strategies of prevention. Prevention of caries (Role of dental plaque. Diet. Nutrition and personal oral health. Fluoride. Fissure sealing). Prevention of periodontal diseases (Methods of plaque control. Common risk approach). Prevention of oral cancer. Fluorosis. Hazards of practice (infection control, mercury and radiation protection).

DPH 604: Health Promotion and Education in Dentistry (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. define and discuss the concept of oral health promotion, its components, and their principles;
2. discuss the importance of and apply both concepts to the improvement of population oral health;
3. explain the rationale for dental education; and

4. describe new concepts designed to foster life-long learning.

Course Contents
Oral health promotion and education. Oral health planning. Smoking cessation. Learning methods in dental education.

DPH 606: Oral Health Policy and Management (3 Units C: LH 45)

Learning Outcomes
At the end of this course, students should be able to:
1. discuss and apply various management and policy principles to the improvement of individual and population oral health; and
2. explain the inter-relationship between the health sector and other sectors of the economy.

Course Contents
Concept of needs and barriers to oral care. Role of the behavioural sciences in dentistry. Models of health behaviour. Primary health care approach in dentistry and the basic package of oral care. Oral health financing. The Nigerian oral health policy. Health service organisations. Oral health manpower. Dental informatics and tele-dentistry.

DPH 608: Research Project (4 Units C: LH 60)

Learning Outcomes
At the end of this course, students should be able to:
1. access, assess and consume academic publications in dentistry; and
2. submit and defend a simple epidemiological study.

Course Contents
Performing the literature search. The concept note. The introduction. Topic selection and framing. Elucidating clear aims and objectives. The literature review. The methodology. Questionnaire development and data abstraction. Analysis of data and presentation of results. The discussion.

DPH 610: Clinical Primary Care Provision and Practical Oral Health Promotion Management (3 Units C: PH 135)

Learning Outcomes
At the end of this course, students should be able to:
1. describe the considerations in providing care in a primary health care centre setting, including manpower, resource and socio-demographic considerations;
2. describe key differences in care organisation and utilisation in primary, secondary and tertiary oral care settings;
3. provide care in a primary health centre setting;
4. apply quality improvement techniques to oral care provision in primary, secondary and tertiary oral healthcare centres, including clinical auditing, process auditing, monitoring and evaluation of programmes;
5. provide practical oral health promotion using various methods to individuals, small groups and large groups in different settings, including schools, clinics, markets, and via television and radio;
6. develop public speaking capabilities that translate to oral health motivation for individuals and groups; and

7. practice other forms of oral health promotion including utilisation of academic and persuasive articles, power-point presentations, oral health posters.

Course Contents
Application of the concepts of prevention and promotion on oral care provision in a primary healthcare setting. Practical oral health promotion to defined sub-groups, with emphasis on similarities and differences (children, pregnant women, non-literate individuals, immunocompromised states). Basic quality improvement principles to oral care provision such as audits, caregiver evaluations.

Minimum Academic Standards

Resource requirements
Universities shall ensure the provision of adequate human, physical, equipment and library facilities in all the learning areas with strong information communication technology (ICT) infrastructure for the implementation of the minimum standards as indicated in this curriculum. The deployment of these resources, including simulation technology facilities and clinical skills laboratory teaching units are required of every university teaching courses that lead to degrees in medicine.

Equipment
The university shall provide adequate and appropriate equipment to meet the teaching and learning requirements in the different areas of the programme with adequate equipment maintenance back-up. In addition, each dental student at the 300 level shall have one complete phantom head unit with its accessories for operative techniques and dental motor with its hand piece and other accessories for prosthetic techniques. Each clinical department shall have one dental operatory for four clinical dental students doing their clerkship in that department medical and dental equipment are highly sensitive to fluctuations in voltage of electrical power supply and to the presence of particles in water. There should be uninterrupted supply of electricity of steady voltage and provision of particle-free pipe-borne water with adequate pressure head. Therefore, a stand-by generator as well as an adequate overhead water-storage tanks are mandatory.

Dental operatories
These constitute the most important clinical facilities in a school of dentistry. Each of these operatories, equipped with instruments and materials, are used by four clinical students undergoing clerkship in each department under the supervision of members of staff. Dental chair and unit complete with accessories and instruments for restorative dentistry.

Other equipment
1. Phantom heads-30
2. Casting machine
3. Dusting collector
4. Electric motors
5. Electric furnace and pump
6. Polishing lathes
7. Model trimmers
8. Plating machine
9. Soldering machine
10. Vacuum-forming achine
11. Water baths

12. Investing crucibles and rings
13. Ultrasonic cleaners
14. Le cren porcelain carver S.S.
15. Probe, sickle no. 54 f.t.
16. Probe, T. T. 12, Weston
17. Plastic instruments-6, 11, 21, 151, 154
18. Amalgam condenser, mortonson no. 2
19. Wax carver 'wards' no. 2
20. Wax spatula no. 5
21. Matrix retainer ivory no. 1 with bands
22. Matrix retainer tofflemire with bands
23. Matrix retainer sigveland, broad, with bands
24. Matrix retainer sigveland, narrow, with bands
25. Scalpel handle
26. Scalpel blade no. 15
27. Glass mixing slab (small)
28. Spatula s. S. D. E. No. 20
29. Agate spatula s. E
30. Chisels t. C. Nos. 1, 2, 3, 4, 5, and 6.chisels chrome steel nos. 29, 47 and 88
31. Gingival margin trimmers, chrome steel d. E. 77/78 and 79/80
32. Excavators s.s.d.e. Nos. 125/126, g2, 212/213, 153/154 and 206/207
33. Mirror 'mirrex' no. 4-handle and head
34. Probe f. T. No. 6
35. Probe briaults d.e.f.t. No. 11
36. Tweezers, college pattern s.s. No. 8
37. Bee bee crown shears no. 9
38. Gum scissors straight no. 1.root canal plugger donaldson's no. 6
39. Broach holder serrated 'ash' no. 4
40. Barbed pulp canal cleansers
41. Plain broaches, spring tempered
42. Root canal reamers 15-80
43. Root canal files 15-80
44. Spanners for hand pieces
45. Basic set of kavo intracompact handpieces comprising:-
46. Straight attachment no. 11
47. Contra-angled/shank no. 20
48. Head no. 79
49. Head (prophylaxis) no. 58
50. Amalgam vibrator head no. 66
51. Separating head no. 54
52. Intra-prophylaxis head 1: 1 (screw-on type for brushes) no. 59
53. Endodontic head no. 53.
54. Slip-joint coupling no. 119glass tubes
55. Clinci rubber discs, sulci size
56. S.S. Huey's mandrels no. 228
57. Moore's mandrels no. 334
58. Burnishers: corrugated pear g. Smooth round h
59. Finishing burs: pear h, pear i, pear k.meisinger 212 no. 4
60. Mandrel no. 311
61. Brush silent stone (for porcelain)
62. Hand bur brush no.3 brass
63. Miller's separating discs 7/8" double-sided

64. Carborundum wheel unmounted ½" x ⅛"
65. Carborundum wheel unmounted ⅝" x ⅛"
66. Punch r.d. Ainsworth pattern.
67. R.D. Clamp forceps stoke's pattern
68. R.D. Clamps nos. 0, 1, 2a, 3, 5, 6, 10, 11, 27, and 28
69. Automatic hand mallet
70. Mallet points nos. 94, 109, 116, 155, and 159
71. Cone socket handle
72. Glass tube
73. Bur stand
74. Ash bur assortment
75. Assortment paper discs ruwa (metal, centre for moore's mandrels)
76. Diamond disc. Flat stroboscopic hi – di 64'22mm
77. Diamond wheel ⅛" x ¼" rounded hi – di 23b
78. Diamond F. G. Long tapered cylinder hi-di 557
79. Diamond C. A. Fine tapered point no. 301
80. Diamond C. A. Tapered cylinder no. 501
81. T.C.F.G. Burs: fissure jet no. 1 (56), fissure jet no. 2 (57), tap fissud plain jet no.170, round jet no.2
82. T.A.C.A. End cutting burs 958
83. Watch makers les $2^{1/2}$" focus
84. Box linen polishing stips – assorted
85. Bottle containing 1gm. Cohesive cold cylinders
86. Plastic amalgam carrier
87. Dentatus vibrator points set
88. Ivory block
89. Camel hard brushes size 10
90. Sable hairbrush size 5
91. Arkansas stone
92. Valve spout cilcan, with plastic reservoir
93. Rubber base spatula (kerr)
94. Small plaster knife
95. Ash dividers
96. Measuring device (sweden) a.b. Svenska dental instr
97. Howes' pliersn.p. 110
98. Square sculptor without handle
99. Pulsave (spectacles)
100. Small wax knife
101. Vernier gauge from practical tooth morphology
102. Pocket knife
103. Glass bottles with tops
104. Dappen's glasses: 1 plain and 1 coloured
105. In addition: 1 small plaster bowl
106. One fretsay frame and blades

Dental Prostheses

There should be one production laboratory for prosthetics and another for crown and bridge. laboratory motors kavo 540-504-359, with knee control type 505 (6 forward speeds).

1. Underbench suspensions
2. Handpiece 277 attached to cable arm
3. 6mm. Inner and outer cables complete
4. Bench peg with handpiece holder

5. Polishing motor complete with churk
6. Phantom head complete with u/l models and bench clamp
7. Surveyors, cottrell eastman pattern
8. Articulators, plasterlets, gillet
9. Articulators, freeplane 75
10. Articulators, dentatus aro dentatus facebow
11. Bunsen burners, mortimer
12. Engraving pencil, makonus
13. Parallometer, bachmann
14. Pencil torches adaptogas

Polishing Room

1. Kavo polishing installation ref. 6580360 floor mounting
2. Kavo polishing motors
3. Ultrasonic cleaner 'walker' type 80T with timer

Packing and Curing Room

1. Dry heat curers ditton laboratory model
2. Bench presses mortimer with spring platform
3. Pressure curing vessels 'polyclar'
4. Measuring vessels 'dreve'
5. Pressure forming unit, druformat U/ZS
6. Compressor unit for druformat ref. EL/S
7. Refrigerator (local supplier)
8. 'Stello' denture flasks

Plaster Room

1. Eezicut model trimmer
2. Bench presses 'mortimer'
3. Vibrator-vibromat mini
4. Vibrator-vibromat V5
5. Vacuum investor degussa 3
6. Duplicating medium heater dentagel DG 8
7. Duplicating medium heater dentage DG 12
8. Boiling out unit-laboramat
9. Duplicating medium chopper
10. Pneumatic chisels (dreve)
11. Scales (local) 0-500gm
12. Water measuring cylinders-100cc.
13. Whiteboard magnetic
14. Plaster/stone dispensers
15. Plaster/stone dispensers-40 kilo
16. Plaster/stone dispensers-10 kilo
17. Plaster/stone dispensers-20 kilo
18. Model storage system grafton-no. 735
19. Fitted with doors, sides and complete with plastic trays
20. Ultrasonic cleaner type 80t with timer

Laboratory for Routine Clinical Investigations

Oral Pathology/Medicine Laboratory

There should be an adequately equipped oral pathology laboratory to carry out investigations relevant to dentistry.

1. Binocular microscopes-20
2. Histokinets
3. Microtomes
4. Slide warmer
5. Heat oven
6. Water distiller
7. Reagents for routine and special stains
8. Hematocrit machine
9. Multimedia projector
10. Histology slide projector-200
11. Refrigerator for storage
12. Glass slides-200
13. Ethanol-5 drums

Radiological Facilities

1. Intra-oral radiography
2. Extra-oral radiography, particularly, those of head and neck
3. Digital 3D orthopantomography
4. Digital 3D cephalometry
5. Cone beam CT
6. Radiography of chest and other parts of the body

This x-ray equipment must be housed in radiation protected rooms.

Theatre Facilities

1. There should be one theatre attached to the dental school for out-patient's dental care under sedation/general anaesthesia.
2. There should also be a main theatre within the teaching hospital complex for major oral and maxillofacial surgical operations.
3. Places at a linear bench for individual phantom head units. manikins, "frasaco" (per kavo dental limited, great britain) with water drainage bottle, plastic models, "frasaco", pairs, with teeth complete.
4. Units for phantom head, (kavo) comprising electro tongue motors, multiple syringes (and airotors) all mounted in a control box with water deed. optional suction system for aspirator tips.
5. Spare sets of teeth, plastic. metal jaws to hold extracted teeth, if available operating lights, "angle poist" or operating lights, or focused spotlights. bunse burners, small, depending on gas supply. operating stools. model trimmers, for plaster, electric, with water supply and drainage (easicut). furnaces, porcelain, "vita", automatic, with electricity, water and drainage. overhead projector, ("ofrex") slide projector, ("kodak, carousel") screen amalgamators, ("dentomat). trolley, mobile on wheels (3 tie "hospital pattern" or "gratnell" type) silamat electric mixer/vibrator (vivadent). kavo mobile high-speed drills complete with control boxes.
6. Phantom units to have monitors and connected to the master phantom of the instructor.

Instruments for Oral Surgery

1. Dental forceps (ash) 1, 113, 295, 29, 76, 76n, 110, 111, 51, 112, 18, 17, 74, 74n, 122, 144,73, 22, 37, 138, 161, 15, 94, 95, 130, 2, 75.
2. Dental forceps-physics
3. Ash rongeur forceps-nos. 3, 4.

4. Warwick james elevators-right, left and straight
5. Couplands chisels-1, 2, 3.
6. Cryer elevators-left, right
7. Apical elevators-left right
8. Periosteal elevators. Ash 9.
9. Austin flap retractors
10. Chisels h36, h37, h37-01, h38, h43, h88.
11. Osteotomes assorted sizes
12. Mushin's dental props-set of four sizes with chain
13. Stainless steel kidney dish 8 in t231.
14. Alli tissue forceps b 195.
15. Kilner needle holder b291.
16. Lingual retractor lack's adult l577.
17. American pattern suction tube h252.
18. Alveolectomy file 454.
19. Kelsey fry mallet g. 721.
20. Double action bone cutters moludue g614.
21. Howarth's periosteal elevator h269.
22. Towel clips h269.
23. Stainless steel gallipots 50z t341.
24. Gillies skin hooks h229.
25. Angled wire cutters h205.
26. Spencer wells artery forceps box-joint 5in b125.
27. Barron's scapel h152.
28. Norman dott's gag for cleft-palate operation with two sizes tongue plates $2^{1/2}$", $2^{3/4}$, h256 hayton williams wire-twisting forceps h10-01
29. Mouth props, large and small mushin's cat. H87.
30. Erich or jelenko arch bars
31. Kay's modified retractors h85-02.
32. Bowdler henty's rake foot retractor h85-01.
33. 'Citenco' motors with cable drive and footswitch l208.
34. Hunt's syringes
35. Mobile suction apparatus
36. Electro-surgical units ms5.
37. Walton's v dental anaesthetic machine
38. Standard anaesthetic machine
39. Autoclavable handpieces (kavo)
40. Assorted surgical burs

Instruments for Orthodontics

1. headgears
2. Face bows
3. Cervical straps
4. High pull straps
5. Hickham (and the cup)
6. Bracket height measurer (gauge)
7. 139 pliers (rectangular arch forming pliers)
8. Turret (for rectangular wires)
9. Edgewise brackets (022)
10. Double buccal tubes (edgewise)
11. Double buccal tubes (begg)
12. Edgewise buccal tubes (022)oval buccal tubes

13. Lingual buttons
14. Preformed ligature wires (.008 or 0101)
15. 014 ligature wire (1 spool)
16. Elastic ringlets (ligature)
17. Preformed stainless steel wires (round and rectangular)
18. Elgiloy wires in straight lengths (for practice)
19. Nitinol wires
20. Rubber bands (light, medium, heavy)
21. Australian wires 0.016, 0.018, 0.020.
22. Bands (upper and lower molars, premolars canines)
23. Begg brackets (flat and curved)
24. Weldable buccal tubes
25. Direct bond buccal tubes
26. Matrix materials (band strips)
27. Composite materials
28. Impression trays
29. With mesial hook: ul/lr
30. With mesial hook: ur/lb
31. Action line mesial elastomeric thread
32. 020 in (51mm.) Diameter
33. 025 in (64mm.) Diameter
34. Colour cooled packages gary
35. Colour cooled packages chuck
36. Elastic kit boxes heavy
37. "C" modules heavy clear-cl chain
38. "C" modules heavy clear-c2 chain
39. "C" modules heavy clear-cig chain
40. Plastic unipoint light wire bracket
41. Adams pliers-universal with hardened steel beaks
42. Spring forming plier with hardened steel beaks
43. Light wire bird beak plier
44. Single-ended ligature director
45. Double-ended ligature director
46. Anes zinc oxyphosphate cement orthodontic kit
47. Preformed torquing
48. Preformed auxiliary
49. Light wire torquing
50. Light wire arch
51. Anterior root torquing
52. Mechanism
53. Elastic ligature 407-001
54. Elastic ligature 407-002
55. Elastic ligature 407-003
56. 's' modules clear separators
57. 52-posterior
58. Begg brackets with mesh base
59. Latex elastic (light)
60. Latex elastic (medium)
61. High flange bracket, plain (light wire bracket)
62. B. High flarge lw-bracket, cont.
63. Lingual
64. Lingual brackets (edgewise/begg)

65. Lingual tubes
66. Direct bond (curved) bracket holder (lingual)
67. Direct bond removing plier (lingual)
68. Lingual ligature cutter (angled 45°)
69. Archwire cutter (angled)
70. Utility plier (curved-weingart type)
71. Direct bond attachment remover (lingual)
72. Special tray material (for indirect bonding)
73. Tongue retractor with saliva ejector
74. Orthognatic surgery
75. Articulator for model surgery
76. Surgical hooks (crimpable)
77. Saw (for models)

Instruments for Periodontology

1. Sterling cartridge syringe (beech-loading)
2. Dental disposable needles
3. Chip syringe student pattern
4. Ash water syringe no. 5
5. Ash dental rubber dam
6. Sigveland self-adjusting matrix clamp, wide, narrow
7. Ivory ash matrix retainer no. 8
8. Ash matrix retainer no. 9
9. Wide thin matrices for 11
10. Narrow thin matrices for 11
11. Assorted matrices for 13
12. Assorted matrices for 12
13. Ash blue inlay wax
14. Ash waste receiver no. 1
15. Dappen's glasses
16. Ash waxed nylon dental floss
17. Ash cotton wool rolls
18. Pestles and mortars
19. Bibs
20. Apron dental napkins-25 boxes of 500
21. Ash syringe jars
22. Ash spirit lamps no. 3
23. Guy's set of six excavators
24. Blake's gingivectomy knives
25. Complete sets of fish gingivectomy knives
26. Moon ash probes
27. Calculus probes (cross)
28. Pocket measuring probe-1, 2
29. Ash scalers
30. 42, 149, 149a, 150, 150a
31. Jaquette 1, 2, 3, guy's gl, g2, g3, g4,
32. Comine 152, 152a
33. Periodontal hoes-4c, 7c, 8c, 9c.
34. Curette/scalers-2l, 2r, 4l, 4r, 13, 14
35. Ash arkansas oilstones
36. De trey mouth mirror heads nos. 4 and 5 nos. 3 and 6
37. Ash serrated mirror handles

38. De trey aluminox vacuum firing porcelain
39. Platinum foil
40. De trey wettax
41. De trey gp nerve canal points
42. Ash celluloid crown forms

Burs

1. Ash tungsten carbide oral surgery burs: fissure and round
2. Ash fenestration burs: size 10, 13, 14, 15, and 16
3. Ash steel burs:round-plain cut: eng. Nos. 1-12
4. Inverted cone eng. Nos. ½ - 10
5. Flat fissure-cross out eng. Nos. ½-12
6. Tappered fissure-coarse cut eng. Nos. 700-703
7. Ash tungsten carbide burs (friction grip)
8. Round plain cut. Eng. 2-8
9. Inverted cone plain cut eng. Nos. 1-4
10. Tappered fissure plain cut eng. Nos. 2-5
11. Flat fissure plain cut eng. Nos. 1-4
12. Tappered fissure long head plain cut eng. Nos. 2l, 3l.
13. Eng-cutting safe side eng. Nos. 2-4
14. Cross cut patterns, flat, tapered eng.:nos. 1-3, 700-702
15. Ash "bt" bur assortments
16. Ash finishing burs
17. Round eng. Nos. 1, h, g, f, e.
18. Pear eng. Nos. 1, h, f, e.
19. Flame eng. Nos. K, h.g.e.
20. Ash burnishing burs
21. Round f, h.
22. Bud g
23. Oval e, h
24. Pear g

Ash Steel Acrylic Trimmers

1. Cylindrical 4, 6
2. Pear 7, 8
3. Bud 10, 11, 12
4. Round 13, 32, 20r, 20b, 33
5. Ash white acrylic trimmers
6. Ash alphine green abrasives mounted
7. Points (angled handpiece)
8. A11, a12, a15, a111, a112, a117, a121, a122, a113
9. A123, a130, a131, a142, a143, a144, a146
10. Alphine green abrasives unmounted wheel and discs
11. A201, a205, a209, a213, a20l, a206, a210, a214

Ash Mandrels

1. 228, 228a, 239, 303, 334, 348-3
2. Swift flexible abrasive discs
3. Large cup, small cup, large wheel, small wheel, wheel cup
4. 15 ash brass wire brushes
5. Standard kavo straight handpiece
6. Standard kavo contra-angled handpiece

7. De trey hs plastic teeth
8. Upper and lower anterior moulds
9. 1h, 2c,/d, 4h, 1n, 1r, 2m, 2p, 3m
10. 3n, 3r, 5n, 5p, 2y, a25, a26, 3x
11. Posterior moulds
12. 1s, 2s, 2m, 3s, 3m, 3l, 4m, 5m, 6m, 7m, 8m
13. Shades 5-15
14. Standard boxes of root-canal instruments complete with reamers, files, broaches
15. Bitewing holders

Furnace and CastingRoom

1. Duplicating flasks (complete) new pattern
2. Casting ring formers complete with sprue former centre. Red, blue, green
3. Sprue former standard type
4. Induction casting machine castomat ex 81
5. Oxy-acetylene melting apparatus
6. Universal soldering torch complete
7. Dentadur twin drying oven and dip
8. Dentastrahl sandblasting cabinet
9. Dentapunkt dp4 spotwelder
10. Dentarapid high-speed grindex
11. Dr. 2 with drust extractor
12. 26,000 rpm with automatic chuck
13. Dentatherm preheating furnace 20/10e
14. Electrolytic polishing bath dentalux
15. Investment mould tongs
16. Asbestos gloves
17. Safety goggles-coloured
18. Natural gas/air torch adaptogas t2

Casting/Plaster Working Areas

1. Vita automatic porcelain furnace
2. Inlay furnace ("carbolite")
3. Casting machine (degussa) centrifrugal model t.3
4. Polishing unit (kavo) with dust extraction
5. Soldering unit (kavo) wall mounted)
6. Investing unit (degussa multivac) vacuum
7. Pair of furnace tongs
8. Vibrators (virilium) for pouring plaster.
9. Nortimer bench press and 6 flasks (ash)
10. Ultrasonic cleaner (with cleaning fluids)
11. Bench grinding motor
12. Steriliser (large) for boiling extracted teeth
13. Refrigerator (domestic)
14. Inlay ringe (dengussa) size 1x. (size 2x and 3x-optional)
15. Copper plating unit (gallon-de luxe model)
16. Pressure polymerizer (orthomax)
17. Scales (for weighing investments.)
18. Drofomat system for pressure forming technique (panadent)
19. Dry heat curing oven (servus)

20. Sandblaster (small) for cleaning metals.
21. Cad/cam machines
22. Intraoral digital scanners

Main Teaching Laboratory

1. Multi media projector
2. Vario reliner lens f3. 5 – 120m
3. Magnetic white boards dri-marker single sided 3 x 4
4. Magnifier viewers lfmi ivory
5. Trimming plates for model trimmers
6. White dental plaster
7. Calcium stone
8. Translucent clear "kallodent"
9. Heat cure monomer
10. Simplex pink cold cure denture material
11. Simple clear denture base material
12. "stellon" denture flasks
13. Double 'stellon' flask clamps
14. Single 'stellon' flask clamps
15. Tropicalised dental modeling wax
16. Sticks of sticky wax
17. Modelling wax for chrome cobalt work
18. Ash medium lingual bar s.s. Ash
19. Ash lower base plates
20. Ash upper base plates
21. Ash gold solder (20 carats)
22. Ash improved extra l-thin articulating paper
23. Standard weighing balance for gold work
24. Ash gold solder 20 carats
25. Gold alloy perfex inlay gold 918^{o}g-939^{o}c
26. Gold mould seal
27. Agar-agar duplicating material
28. Extra-large plaster bowls
29. Cutting nippers
30. Humidors
31. Zelgan alginate impression material
32. Cromopan fix adhesive for impression tray
33. Fix adhesive solvent
34. De trey special tray material
35. Zno/eugenol impression paste
36. Paribar composition
37. Zelgan impression trays. Partial dentures"popular assortment" – contents AO, A1, A2 CO, C1, C2 JCH3, CLCH 3 anat. 2 upper anat. 2 lower
38. Popular assortment-zelgan edentulous trays contents A1, A2, A3, C1, C2, C3, CLCH2, JCH2, CASC04, CASC07
39. Universal partial metal trays
40. Ash anatomical impression trays
41. Edentulous upper sizes 1, 2, 3
42. Edentulous lower sizes 1, 2, 3
43. Ash cleft palate impression trays for infants sizes 1, 2, 3, 4

Filing Materials

1. Amalgams: solila alloy-fine grain, medium grain
2. Mercury triple distilled
3. Encapsulated alloys: "spheralloy" "spheroidalamalgam"'"amalcap" fine grain no. 1
4. Ash alloy dispensers-1 OZ capacity
5. Ash mercury droppers-1 OZ capacity

Fissure Sealants (with etching)
1. Expoxolite cpf kit 9070
2. Nura seal (polymerized with U. V. Gun)

Sublining and Temporary Filling (including pulp capping agents)
1. "S. S. White" cavity liner (quick setting ZNO)
2. "kalzinol"-powder and liquid
3. "kerrs "cavitec" bland temp. Filling
4. Kerrs "mpc" (multiplacement calcium hydroxide cavity liner
   To replace "hydrex"
5. "Tubulitec" cavity liner with sodium fluoride

Cements
1. De trey zinc phosphate cement imoroved
2. Pure white, light yellow, golden brown,
3. Golden yellow, pinkish white
4. De trey cement liquid
5. "Oxicap" (vivadent) encapsulated
6. "Polycap" encapsulated
7. "Vita utilith" for cementation of porcelain
8. Jacket crown (powder and liquid)
9. "Stailine" E. B. A. Crown and bridge cement (powder and liquid)
10. "Sedanol" temporary cement (powder and liquid)

Root Canal Paste
1. "Calax"-calcium hydroxide root filling system
2. "N2" root canal filling material
3. "Kri" paste (bismuth iodoform paraffin paste = BIPP for chronic conditions

Silicate Cement
1. Popular shade (powder and liquid) of biotery (de trey's) outfit
2. Cocoa-butter silicate protecting medium (S. S. White)
3. "Silicap" (vivadent) encapsulated machine (silimat) mix.
4. Popular shade (powder and liquid) S. S. White "M Q" silicate cement

Acrylic Autopolymerising (monofilled composites)
1. "Serviton" complete outfit
2. 'Scutton' epimine plaster
3. Silicone cils, protective film for acrylic (sevriton)

Composites:"adaptic" (Johnson and Johnson)
1. "Smile" kerr
2. "Cosmic" (de trey)
3. Epoxylite hl-72 (lee pharm.)

4. "Brendant" (kerrs)
5. "Opotov" (teledyne)
6. Acid etch"concise" 3m"adaptic" (Johnson and Johnson)
7. "Pearl on" (amalg, dental co.)"restodent" (Lee pharm.)
8. Epoxylite cpf kit 9070 (fissure sealment with U. V. Gun)

Temporary fillings

1. Gutta-percha-temporary stopping (de trey's duropercha")
2. "Provipast" temporary filling paste (de trey)

Miscellaneous Drugs and Supplies

1. Chloroform (for external use only)
2. Distilled water
3. Ethylene diamine tetra-acetic acid (e. D. T. A.)
4. Used in root canal therapy
5. Eucalyptus oil
6. 'Eugenol (oil of cloves)
7. Glycerin
8. "Hibitane" concentrate ("savlon") 1 : 20
9. "Hibitane" concentrate ("savlon") 1 : 30
10. Methylated spirit (industrial)
11. Petroleum jelly ('vaseline')
12. "fix" solvent 10 x 205g. Aerosol
13. "hold" (getz) impression/adhesive 25 x 225g. Aerosol
14. Masking vanish, "d. F. L2"
15. Pumice powder
16. Plate powder, "goddards"
17. Jewellers rouge (block form)
18. Sandarac varnish
19. Titanium dioxide
20. Whiting powder
21. "Copalite.. Varnish (cavity varnish or protection for silicate)
22. Copper plating solution
23. Cetrimide (cetavlon)
24. Borax powder
25. Borax crystal fluxes

Impression Materials

1. Composition: sticks, (kerrs) red (crowns) grey (inlay)
2. (kerr) blue-type 1 (hard)
3. Zn0/eugenol impression paste
4. Plaster
5. "Gypsogum"-proprietary plaster for impression
6. Silicon rubber
7. "Accralastic" (kerr)
8. Paribar composition
9. Polysulphide eubber
10. "Permalastic"-(kerr) light and heavy

Miscellaneous Instruments

1. Copper rings-assorted
2. "Spirec" wire for pin retention

3. "Dentatus" dentine screws (assorted sizes and lengths with spanners)
4. German silver wire-1.0mm

Matching Instruments for Root Canal Therapy

1. "Girawood" reamers, nos. 1-6
2. Matching sprues, metal, S. S. Nos. 1-6
3. Matching sprues, plaster, nos. 1-6 (burn out)
4. Matching posts, S. S. Nos. 1-6
5. Matching "mcgibbon" hollow crown tubes and
6. Stylus for decoronated teeth requiring
7. Root canal therapy
8. Gates glidden burs
9. Gutta percha points, nos. 1-12
10. Silver points, nos. 1-12
11. Apical silver points, 40-140 (3mm. And 5mm.)
12. Apical silver tip. Adjustable holder, 45-80, 90-140
13. "pulpadent" rotary paste fillers-r. A. And st.
14. Sizes 1-4
15. P. D. Millimeter scales
16. Posts, readymade for direct placement- "Charlton" and "kurer"
17. Ash tin foil, (gauge 40-extra thin)
18. Clear varnish

Instruments

- Luster cast (kerr)
- Soldering investment (Ransoms and Randolph)

Plasters

1. Vel mix (kerr)
2. Kaffir d (stone hard)
3. Castone (de trey)
4. Plaster of paris, surgical, whit

Waxes

1. Sticks inlay wax (kerr's type 2)
2. Cement wax (ash)
3. Tropicalised modelling wax, pink no. 4 toughened (ash)
4. Red wax, soft, for boxing in impressions (Metrodent)
5. Wax carving blocks for tooth carving (ash)
6. Profile waxes (green) no. 1 (chaperlin 'Jacobs)
7. Profile wax 2.0mm. Round (chaperlin 'Jacobs)
8. Profile wax 2 x 6.5mm. Band (chaperlin 'Jacobs)
9. Profile wax 3.0mm. Round (chaperlin 'Jacobs)
10. Sheet wax 0.3mm. (green) (Bremer)

Instruments for Storage and Sterilization Facilities

There should be a main store to provide materials and instruments for the dental hospital. Sterilization of instruments can either be done centrally or in units. In either case, the necessary storage space, work-top space and accommodation for the sterilizers must be provided.

Other Units

Accident and Emergency Clinic
Within the dental hospital, there should be an accident/emergency unit which should be opened 24 hours.

In-Patient Beds
There should be a clearly defined ward-space for the in-patient management of dental and maxillofacial patients. The bed complement shall be such as to offer clinical teachers the facilities to teach hospital dentistry. It is, however, realised that ordinarily, the bed complement for dental hospital is not very large. Nevertheless, it is important that the minimum complement be equitably distributed for male, female and paediatric occupancy.

Medical Records
The medical records are important for proper care of patients, research data base and medico-legal reasons. The facilities should be a part of records department which must be located within the dental hospital and be manned by trained records officers.

Pharmacy Unit
There should be a small pharmacy unit within the dental school.

Staffing

Academic Staff/Student Ratio
The minimum ratio of academic staff to students in the basic medical sciences shall be 1:15 in each subject area while the minimum for clinical based medicine and surgery, and dentistry shall be 1:10 in each subject area. The mix of academic staff shall be in the ratio of 20%: 35%: 45% for professorial grade, senior lectureship and below. The following should also be pursued:

1. staff training programme should be pursued by all universities for the training of lecturers in teaching methods;
2. where shortage of manpower is obvious extensive use of self-instructional materials should be greatly encouraged; and
3. postgraduate programmes should be mounted in relevant clinical departments as may be required.

To start any programme in this discipline, there should be a minimum of six academic staff. There is need to have a reasonable number of staff with PhD degrees accounting for at least 70% of the total number in basic medical sciences having adequate teaching experience for every programme in the discipline. The entry point for lecturers in Pharmacology in the basic clinical sciences is PhD. For all other subjects in the basic clinical and clinical sciences the entry point for lecturers is the Fellowship of the National Postgraduate Medical College of Nigeria or its equivalent. Candidates must have additional PhD or earned MD to proceed from the senior lecturer level.

Administrative Support Staff
The services of the administrative support staff are indispensable in the proper administration of departments and faculty offices. it is important to recruit very competent, computer literate senior staff.

Technical Support Personnel

The services of technical support staff, which are indispensable in the proper running of laboratories and workshops, are required. It is important to recruit very competent senior technical staff to maintain teaching and research equipment. They are also to undergo regular training to keep them abreast of developments in equipment operation and maintenance.

Library

Universities should leverage on available technology to put in place rich databases and other electronic/digital library and information resources. In addition well stock and current hardcopies of reference and other textual materials should be provided centrally at the level of the faculty. A well network digital library should serve the entire university community. Availability of wireless facilities (wifi) with adequate bandwidth should enhance access to these electronic resources. In any case, there should be internet ready workstations available in the library for least 25% of the total student enrolled in each academic programme. The funding of the library should be in line with NUC guidelines. As the effectiveness of teaching is very much dependent on active research, facilities that encourage research are therefore, essential components of a medical school. There should be a well- equipped medical library, with sufficient reading space and adequate supply of up-to-date journals, periodicals and reference textbooks in all fields of medicine. Audio-visual and e-learning facilities as resource for learning must also be provided. The library shall have modern information communication facilities for electronic access and retrieval of information. Inter library loan services should be encouraged.

Classrooms, Laboratories, Workshops and Office Spaces

The university shall provide adequate and appropriate physical spaces to meet the teaching requirements of the different areas of this curriculum.

Lecture/Seminar Rooms and Laboratories

These should be adequate in number and size. Sharing of facilities at hospital and university sites should be encouraged as preclinical lectures can be given ~~in~~ lecture rooms in hospital where these are available and vice versa. There should be a lecture theatre/auditorium large enough to accommodate all the students at a particular level within the college/faculty. Each department should have a seminar room for tutorials. There should be adequate laboratory spaces for all the departments in all universities.

Pre-Clinical

Separate departments of anatomy, physiology and medical biochemistry should be maintained. It should be emphasised that the laboratory environment for these should facilitate the demonstration and observation of procedures.

Clinical

There should be at least a multi-purpose teaching laboratory large enough to accommodate students on posting in the department of laboratory medicine. The physiology laboratory may also serve as pharmacology laboratory. The associated teaching hospital should have a clinical students' hostel. Also, there should be side laboratories for all students on clinical posting. The laboratory must meet the needs of the various cadres at various levels of training. a clinical skills laboratory is mandatory.

Research Laboratories

It is desirable to have research laboratories for postgraduate students and academic staff in the medical school. Each dental department shall have a complete dental operatory for research.

Staff Offices
Space for these staff offices should be provided for academic and non-academic staff. Sharing of rooms where necessary with provision of secretarial help should be encouraged. Academic and non-academic staff offices must meet the NUC guidelines which should also include equipment maintenance technicians' office. A common room should be provided for each of the following: academic staff, non-academic staff and students. The standard space requirement as shown below shall apply.

Position/rank	m^2
Professor's office	18.50
Head of department's office	18.50
Tutorial teaching staff's office	13.50
Other teaching staff space	7.00
Technical staff space	7.00
Secretarial space	7.00
Seminar space/per student sitting	1.85

Hospital Facilities
The teaching hospitals should also have sufficient number and variety of clinical cases for medical instruction, and there should also be an adequate number of teaching and non-teaching staff and infrastructure.
Hospital facilities including wards/bed spaces, the minimum laboratory facilities and number of patients in each teaching hospital and medical school must meet the guidelines. Each medical school must have a well-developed simulation technology and clinical stalls laboratory.

Simulation Laboratory and Clinical Skills Acquisition Centre
All universities should have a clinical skill acquisition centre with mannikins and where possible a simulation laboratory should be in place.

Student Accommodation
All universities should provide accommodation for medical students. Where possible all students should live in university hostels with not more than two students sharing a room for health reasons. Clinical students must live within hospital premises or at most 2km from the teaching hospital.