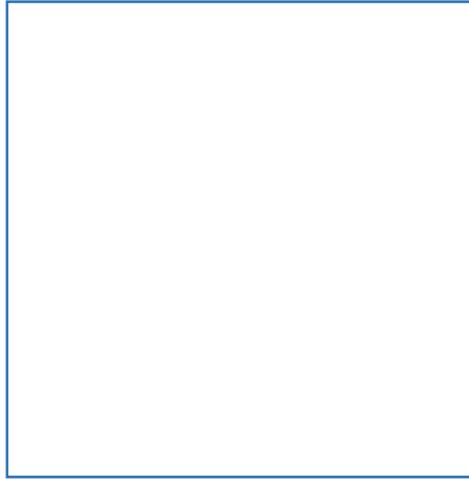


SCHOOL OF ALLIED HEALTH SCIENCES



Professor Dora O. Akinboye

DEAN

DEPARTMENT OF MEDICAL LABORATORY SCIENCE



Prof. Esther N. Adejumo

Head of Department

**LIST OF FACULTY FOR THE BACHELOR OF MEDICAL LABORATORY SCIENCE
(B.MLS.) PROGRAMME**

S/N	Name	Position	Area of Specialization
1.	ADEJUMO, Esther N.	Professor/HOD	Chemical Pathology and Immunology
2.	IHONGBE, John C.	Professor	Medical Microbiology and Parasitology
3.	AJAYI, Olutayo I.	Professor	Haematology and Blood Transfusion Science
4.	ALLI, Oyebode A.	Professor	Medical Microbiology/Molecular Diagnostics
5.	OCHEI John Okeleke	Professor	Medical Microbiology and Parasitology
6.	EKUN, O. A.	Associate Professor	Chemical Pathology/Molecular Diagnostics
7.	ADESINA, Opeyemi O.	Senior Lecturer	Haematology and Blood Transfusion Science
8.	AKINDUTI, Paul A.	Senior Lecturer	Medical Microbiology and Virology
9.	OGUNSOLA, Abimbola	Senior Lecturer	Haematology and Blood Transfusion Science
10.	ENITAN, Seyi S.	Lecturer I	Medical Microbiology and Immunology
11.	OFEM, Oluchi G.	Lecturer I	Medical Microbiology and Parasitology
12.	DADA, Michael O.	Lecturer I	Medical Microbiology and Public Health
13.	UDOFIA, Stephen S.	Lecturer I	Haematology and Blood Transfusion Science
14.	BANKOLE, Julius	Lecturer 1	Histopathology/Cytopathology
15.	ILEOMA, Emmanuel O.	Lecturer 1	Haematology and Blood Transfusion Science
16.	AKINJINMI, Akintunde A.	Lecturer 1	Chemical Pathology
17.	OLUWALOYE, Taiwo G.	Lecturer 11	Histopathology/Cytopathology
18.	OSAKUE, Eguagie O.	Lecturer 11	Chemical Pathology/Toxicology
19.	ONYEGBULA. Kenneth C.	Lecturer 11	Histopathology/Cytopathology
20.	EFFIONG, Effiong J.	Lecturer 11	Medical Microbiology and Parasitology
21.	OLUSANYA, Temitope O.	Lecturer 11	Chemical Pathology/Toxicology
22.	OKOROCHI Chinenye A.	Lecturer 11	Histopathology/ Cytopathology
23.	AKINYO Adeyinka S	Lecturer 11	Histopathology/Cytopathology
24.	FATUNMBI Olusola J.	Lecturer 11	Chemical Pathology
25.	NWAEJIGH Promise C.	Lecturer 11	Chemical Pathology/Public Health

**LIST OF NON-TEACHING TECHNICAL STAFF FOR THE BACHELOR OF
MEDICAL LABORATORY SCIENCE (B.MLS.) PROGRAMME**

S/N	Name of Staff	Present Rank/Position	Area of Specialization
1.	EKPUDA, Sydney	Principal Medical Laboratory Scientist	Medical Microbiology and Parasitology
2.	JOSHUA, Bitrus A.	Medical Laboratory Scientist	Histopathology/ Cytopathology
3.	AFOLABI-IMARALU Abimbola	Medical Laboratory Scientist	Chemical Pathology
4.	ADEMOLA-KEMIKI, Damilola C.	Medical Laboratory Scientist	Histopathology/Cytopathology
5.	IDOWU, Adebanke.	Medical Laboratory Scientist	Medical Microbiology/Public Health
6.	ADEYEMI, Adekunle T.	Medical Laboratory Scientist	Haematology and Blood Transfusion Science
7.	OWOLABI Omolara	Medical Laboratory Scientist	Medical Microbiology
8.	OMIDIORA, Charles S.	Medical Laboratory Scientist	Haematology and Blood Transfusion Science
9.	OGUNFUNMINIYI, Damilola C.	Medical Laboratory Scientist	Haematology Blood Transfusion Science
10.	AYOFE, Olayinka O.	Medical Laboratory Scientist	Histopathology/Cytopathology
11.	AUDU, Stephen D.	Medical Laboratory Scientist	Chemical Pathology
12.	ENITAN, Comfort B.	Medical Laboratory Scientist	Chemical Pathology
13.	CHIMA, Esther K.	Medical Laboratory Technician	General
14.	ADENUGA, Ile-Ola B.	Medical Laboratory Technician	General
15.	UKACHUKWU-IGWE, Blessing N.	Medical Laboratory Technician	General
16.	KOLAWOLE, Bolanle V.	Medical Laboratory Technician	General
17.	JEGEDE, Adetola O.	Medical Laboratory Technician	General

**LIST OF ADMINISTRATIVE STAFF FOR THE BACHELOR OF MEDICAL
LABORATORY SCIENCE (B.MLS.) PROGRAMME**

S/N	Name of Staff	Rank/Designation	Area of Specialization
1.	AMAQ, Omolola T.	Administrative Assistant	Secretarial and Administrative duties
2.	OBASI, Kingsley	Administrative Assistant	Secretarial and Administrative duties

B.MLS. Medical Laboratory Science

Overview

The Medical Laboratory Science (MLS) programme has over the years transited from a 4-year Bachelor of Science (B.Sc.) to a 5-year Bachelor of Medical Laboratory Science (B.MLS) honours degree offered in many public and private Universities in Nigeria. This was necessitated by some inadequacies observed in the training curriculum and the need to build capacity at the undergraduate level, to cater for advances in modern diagnostics and disease dynamics.

Medical Laboratory Science Programme offers the Bachelor of Medical Laboratory Science Degree (BMLS), and runs in a faculty setting (Faculty of Medical Laboratory Science and with each area of specialisation, Medical Microbiology, Clinical Chemistry and Immunology, Hematology and Blood Transfusion Science, Histopathology and Histochemistry, and Parasitology) being a Department. However, the Department of Medical Laboratory Science, Babcock University is currently in the School of Public and Allied Health, Benjamin Carson College of Health and Medical Sciences.

Philosophy

The broad philosophy of training in Medical Laboratory Science is to provide sound academic and professional background for the production of Medical Laboratory Scientists who would be capable of working anywhere in Nigeria and globally. It is also aimed at producing Medical Laboratory Scientists who would satisfy internationally recognisable standards and who could undertake further training towards specialization, and Medical Laboratory Scientists with sufficient management ability to play a leadership role and entrepreneurship in employing others, establishing self, and also in training and general practice of medical laboratory science.

Medical Laboratory Science entails the study of human and animal tissues, body fluid, excretions and the production of biological materials for the purposes of disease prevention, diagnosis, treatment and research to the extent that they relate to the state of well-being of the person(s) or animals(s) whose tissues or excretions are involved.

1. The broad philosophy of Medical education in Nigeria as it affects Medical Laboratory Science should be.

- a. To provide an in-depth scientific and professional background for the production of Medical Laboratory Scientists who would be capable of working anywhere in Nigeria including Primary Health Care, and internationally.
- b. To produce Medical Laboratory Scientists with sufficient management ability to play a leadership role in training and the practice of Medical Laboratory Science.

2. Medical Laboratory Science is a very dynamic profession with continuous emergence of new procedures and instruments which justify adequate orientation for operational research by Practitioners. The graduates are therefore expected to keep pace with changing trends.

Our philosophy is anchored on the harmonious development of the intellectual, physical, social and spiritual potentials of students; and inculcating in men and women a nobility of character.

Objectives

The objectives of the Bachelor honours degree programme in Medical Laboratory Science (B.MLS) are to:

1. Provide sound academic and professional background for the production of Medical Laboratory Scientists who would be capable of working anywhere in Nigeria and internationally;
2. Instil in students a sense of enthusiasm for the profession; an appreciation of its application in different contexts (in areas such as general medicine, food and beverages, pharmaceutical industries, utility departments such as water corporations; research institutions and many others);
3. Involve the students in an intellectually stimulating and satisfying experience of learning, studying and research;
4. Provide students with a broad and balanced foundation of medical laboratory knowledge and practical skills; performing effectively in clinical diagnostic services, academics and quality assurance; and function independently or in collaboration with other members of the health team in the care of individuals and groups at all levels of health care;
5. Develop in students, the ability to apply their medical laboratory knowledge and skills to the solution of theoretical and practical problems in laboratory medicine;
6. Develop in students through an education in medical laboratory sciences, a range of transferable skills of value in medical and non-medical employment;
7. Provide students with a knowledge and skills base from which they can proceed to further studies in specialised areas involving medical sciences;

8. To generate in students, an appreciation of the importance of medical laboratory sciences in an industrial, economic, environmental, health and social context;
9. Generate students with the ability to produce biological and diagnostic reagents as well as being able to fabricate and maintain laboratory equipment; and
10. Empower graduates of Medical Laboratory Science with skills that will enable them engage in income yielding ventures.

Unique Features of the Programme

1. The BMLS curriculum aims at training a Medical Laboratory Scientist with an area of specialisation in the subject area thus graduating with quasi specialisation at the first degree level.
2. Final year BMLS students specialising in the 6 core departmental areas of Medical Laboratory Science take different parallel courses.

Employability Skills

1. Skills in safe handling of laboratory materials, taking into account specific and potential hazards
2. Skills required for the conduct of standard laboratory procedures involved in analytical and diagnostic work
3. Competence in planning, design and execution of practical investigation from the problem recognition stage through to the evaluation and appraisal of results and findings - i.e. also including the ability to select appropriate techniques and procedures
4. Skills to operate standard laboratory instrumentation such as that used for laboratory investigations
5. Ability to interpret data derived from laboratory investigations in terms of their significance
6. Ability to conduct risk assessments concerning some laboratory reagents and procedures

21st Century Skills

1. Collaboration and team work
2. Creativity and imagination
3. Critical thinking
4. Problem solving
5. Flexibility and adaptability
6. Information Literacy
7. Leadership
8. Civic literacy and citizenship
9. Social responsibility
10. Technology literacy

11. Initiative

Admission and Graduation Requirements

The modes of entry are UTME and Direct Entry. To be admitted into the B.MLS programme the candidate must meet these entry requirements.

Admission Requirements

The B.MLS degree programme shall run for 5 years for Unified Tertiary Matriculation Examination entry candidates and 4 years for Direct Entry candidates.

Five-Year Degree Programme

In addition to appropriate UTME scores, five Senior Secondary Certificate (SSC) (or its equivalent) credit passes including Mathematics, Physics, Chemistry, Biology and English Language in not more than two sittings.

Direct Entry (DE)

Candidates of Allied Health Science disciplines with BSc in courses such as Biochemistry, Anatomy, Physiology, Microbiology, Zoology, and candidates with GCE 'A' level with minimum of credit passes in Biology, Chemistry and Physics in addition to the above Senior Secondary Certificate (SSC) credit passes, may enter the Programme at 200 Level. Holders of Medical Laboratory Technician (MLT) certificate of the Medical Laboratory Science Council of Nigeria who have at least five Senior Secondary Certificate credit passes in Physics, Chemistry, Biology, Mathematics and English Language (WAEC, NECO and NABTEB) at no more than 2 sittings are eligible for direct entry at 200 level. The medical laboratory technician already has an appropriate academic knowledge and skill in Medical Laboratory Science.

Grading system: The pass mark for core courses is 50%.

Graduation requirements

To be eligible for the award of the Bachelor degree in Medical laboratory Science, a student must have:

1. passed all the core courses, and the University and Faculty/School required courses
2. accumulated a minimum of 220 Course Units for students admitted through UTME and 182 Course Units for students admitted to 200 level; and
3. attained a minimum CGPA of 2.50.
4. a student must be found worthy in character throughout the period of his/her studentship and must accumulate the total units prescribed for the programme from Core, Faculty and General Studies courses as well as Laboratory postings, First Professional Examination, Seminar, Final Professional Examination and Final Year Project.

The distribution of the credit requirement by Level is as follows:

LEVEL	1ST SEMESTER	2ND SEMESTER	TOTAL
100	19	19	38
200	24	24	48
300	22	21	43
400	23	24	47
500	21	21	42
TOTAL	109	109	218

Global Course Structure

Preamble

Courses shall be provided leading to the degree of Bachelor of Medical Laboratory Science which may be awarded to students who have successfully fulfilled all academic requirements. The training shall be a combination of teacher-directed, tutor-guided, self-learning and problem-based methods.

Programme Course Structure:

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**100 Level Courses**

Course Code	Course Title	Status (Core/Elective)	Semesters	
			1 st	2 nd
BU-GST 011	Citizenship Orientation		0	
BU-GST 012	Citizenship Orientation			0
BIO 101	General Biology I	C	2	-
CHM 101	General Chemistry I	C	2	-
COS 101	Introduction to Computing Science	C	3	-
PHY 101	General Physics I	C	2	-
BIO 102	General Biology II	C	-	2
CHM 102	General Chemistry II	C	-	2
PHY 102	General Physics II	C	-	2
BIO 107	General Biology Practical I	C	1	-
CHM 107	General Chemistry Practical I	C	1	-
PHY 107	General Physics Practical I	C	1	-
BIO 108	General Biology Practical II	C	-	1
CHM 108	General Chemistry Practical II	C	-	1
PHY 108	General Physics Practical II	C	-	1
GST 111	Communication in English	C	2	-
GST 112	Nigerian People and Culture	C	-	2
BU-BIO 114	Health and Nutrition Biology	C	-	2
BU- GST 105	Use Of Library and Study Skills	C	2	-
BU- GST 112	Health Principles	C	-	1
BU- GST 120	ICT Fundamentals and Office Productivity Management	C	1	-
BU- GST 126	Life and Teachings of Christ the Messiah	C	-	3
BU-MTH 101	Elementary Mathematics I	C	2	-
BU- MTH 102	Elementary Mathematics II	C	-	2
	Total (38 Credit Units)		19	19

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE

200 Level Courses

Course Code	Course Title	Status (Core/Elective)	Semesters	
			1st	2 nd
BU-GST 021	Citizenship Orientation		0	
BU-GST 022	Citizenship Orientation			0
ANA 205	Anatomy of Upper and Lower Limbs for Allied Health	C	2	-
BCH 201	General Biochemistry I	C	2	-
MCB 201	Introduction to General Microbiology	C	2	-
MLS 201	Introduction to Medical Laboratory Science	C	2	-
PIO 201	Introductory Physiology and Blood	C	2	-
STA 201	Biostatistics	C	2	-
ANA202	Histology of Basic Tissues	C	-	2
BCH 202	General Biochemistry II	C	-	2
ANA 203	General and Systemic Embryology	C	2	-
BCH 203	General Biochemistry Practical	C	1	-
PIO 203	Physiology of Excitable Tissues	C	2	-
ENT 211	Entrepreneurship and Innovation	C	2	-
GST 212	Philosophy, Logic and Human Existence	C	-	2
PIO 214	Introduction to Cardiovascular and Respiratory Physiology	C	-	3
PIO 216	Gastrointestinal Physiology	C	-	2
BU-ANA 218	Gross Anatomy of Head, Neck and Neuroanatomy,	C	-	3
BU-ANA204	Anatomy of Thorax, Abdomen, Pelvis and Perineum	C	-	3
BU-BCH 224	Functional Biochemistry	C	-	3
BU-MLS 202	Laboratory Hazard Management I	C	-	2
BU-GST 200	Communication in French	C	-	1
BU-GST 215	Adventist Heritage	C	3	-
BU-GST 220	Origins and Science	C	-	1
BU-GST 221	Introduction to Agriculture	C	1	-
BU-GST 290	Introduction to Data Analytics	C	1	-
	Total (48 Credit Units)	Status	24	24

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**300 Level Courses**

Course Code	Course Title	Status (Core/Elective)	Semesters	
			1st	2nd
BU-GST 031	Citizenship Orientation		0	
BU-GST 032	Citizenship Orientation			0
MLS 301	Basic Clinical Chemistry	C	2	-
PHA 303	Basic Pharmacology and Toxicology	C	2	-
MLS 302	Basic Haematology	C	-	2
MLS 303	Basic Microbiology	C	2	-
BU-BCH 330	Forensic Biochemistry for Allied Health Sciences	C		2
BU-BCH 332	Hormonal Biochemistry for Allied Health Sciences	C	-	2
BU-PHA 344	Advanced Basic Pharmacology and Toxicology	C	-	2
PIO 303	Endocrinology	C	2	
MLS 304	Basic Histopathology	C	-	2
MLS 305	Basic Immunology	C	2	-
PIO 309	Practical Physiology II	C	1	
MLS 306	Laboratory Posting I	C	-	2
MLS 307	Practical Exercise I	C	2	-
MLS 308	Fundamentals of blood group serology	C	-	2
MLS 309	Basic Medical Parasitology and entomology	C	2	-
MLS 310	Biomedical Engineering	C	-	2
BU-PHA 341	Practical in Pharmacology and Toxicology	C	2	
ENT 312	Venture Creation	C	-	2
GST 312	Peace and Conflict Resolution	C	-	2
BU – GST 310	Data Analysis Using Advanced Excel, SPSS, Power BI, Tableau	C	1	-
BU-MLS 311	Medical Genetics and Molecular Diagnostics I	C	3	-
BU – GST 312	Family Life	C	-	1

BU – GST 317	Fundamentals of Christian Faith	C	3	-
	Total (45 Credit Units)		24	21

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**400 Level Courses**

Course Code	Course Title	Status (Core/Elective)	Semesters	
			1st	2nd
BU-GST 041	Citizenship Orientation		0	
BU-GST 042	Citizenship Orientation			0
MLS 401	Laboratory Management and Function, Laboratory practice	C	2	-
MLS 402	Medical Laboratory Haematology	C	-	2
MLS 403	Medical Laboratory Histopathology I	C	2	-
MLS 404	Medical Laboratory Microbiology I	C	-	2
MLS 405	Laboratory Instrumentation and Techniques	C	2	-
MLS 406	Research Methodology	C	-	2
MLS 407	Practical Exercise II	C	2	-
MLS 408	Laboratory Posting II	C	-	2
BU-MLS 409	Introductory Medical Virology	C	3	-
MLS 410	Clinical Chemistry I	C	-	2
MLS 411	Blood Group Serology	C	2	-
MLS 412	Professional Ethics in Med Lab Science	C	-	2
BU-MLS 413	Immunology and Immunochemistry	C	3	-
BU-MLS 414	Exfoliative Cytology	C	-	3
BU-MLS 415	Medical Law and Counseling Skills	C	3	-
BU-MLS 417	Laboratory Hazard Management II	C	3	-
BU-MLS 418	Medical Parasitology and Entomology	C	-	3
BU-MLS 420	Introductory Medical Mycology	C	-	3
BU- GST 400	Religion and Social Ethics	C	-	3
BU- GST 440	E- Project Management & Simulation	C	1	-
	Total (47 Credit Units)		23	24

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**500 Level Courses****MEDICAL MICROBIOLOGY & PARASITOLOGY OPTION**

Course Code	Course Title	Status Core/Elective	Semester	
			1 st	2 nd
BU-GST 051	Citizenship Orientation		0	
BU-GST 052	Citizenship Orientation			0
MLS 502	Laboratory Posting III	C	-	2
MLS 503	Practical Exercises III	C	2	-
MLS 590	Research Project	C	-	6
MLS 505	Seminar	C	2	-
MLS 508	Clinical Chemistry II	C	-	2
MLS 510	Medical Laboratory Haematology II	C	-	2
MLS 512	Medical Laboratory Histopathology II	C	-	2
MLS 514	Medical Laboratory Microbiology II	C	-	2
BU-MLS 513	Medical Parasitology and Epidemiology	C	2	-
BU-MLS 515	Medical Genetics and Bioinformatics	C	3	-
BU-MLS 517	Systemic Bacteriology	C	2	-
BU-MLS 519	Immunology of Infectious Diseases	C	3	-
BU-MLS 520	Currents Trends in Infectious Disease Diagnostics	C	-	2
BU-MLS 523	Laboratory Techniques in Medical Microbiology	C	3	-
BU-MLS 525	Public Health and Pharmaceutical Microbiology	C	3	-
BU- GST 500	Adventist Heritage Seminar Series	C	-	3
BU- GST 540	Introduction to Digital Marketing	C	1	-
	TOTAL (42 UNITS)		21	21

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**500 Level Courses****CHEMICAL PATHOLOGY OPTION**

Course Code	Course Title Status (Core/Elective)	Status Core/Elective	Semester	
			1st	2nd
BU-GST 051	Citizenship Orientation		0	
BU-GST 052	Citizenship Orientation			0
MLS 502	Laboratory Posting III	C	-	2
MLS 503	Practical Exercises III	C	2	-
MLS 590	Research Project	C	-	6
MLS 505	Seminar	C	2	-
MLS 508	Clinical Chemistry II	C	-	2
MLS 510	Medical Laboratory Haematology II	C	-	2
MLS 512	Medical Laboratory histopathology II	C	-	2
MLS 514	Medical Laboratory Microbiology II	C	-	2
BU-MLS 515	Medical Genetics and Bioinformatics	C	3	-
BU-MLS 529	Clinical Enzymology	C	2	-
BU-MLS 530	Clinical Vitaminology and Toxicology	C	-	2
BU-MLS 531	Laboratory Techniques in Clinical Chemistry	C	3	-
BU-MLS 551	Proteomics and Metabolomics	C	2	-
BU-MLS 553	Clinical and Reproductive Endocrinology	C	2	-
BU-MLS 555	Biochemical Aspects of Nuclear Medicine	C	2	-
BU-MLS 557	Metabolic Disorders	C	2	-
BU- GST 500	Adventist Heritage Seminar Series	C	-	3
BU- GST 540	Introduction to Digital Marketing	C	1	-
	TOTAL (42 UNITS)		21	21

BMLS (Hons) MEDICAL LABORATORY SCIENCE**500 Level Courses****HISTOPATHOLOGY/CYTOLOGY OPTION**

Course Code	Course Title	Status	Semester	
			Core/Elective	1st
BU-GST 051	Citizenship Orientation		0	
BU-GST 052	Citizenship Orientation			0
MLS 502	Laboratory Posting III	C	-	2
MLS 503	Practical Exercises III	C	2	-
MLS 590	Research Project	C	-	6
MLS 505	Seminar	C	2	-
MLS 508	Clinical Chemistry II	C	-	2
MLS 510	Medical Laboratory Haematology II	C	2	-
MLS 512	Medical Laboratory Histopathology II	C	-	2
MLS 514	Medical Laboratory Microbiology II	C	2	-
BU-MLS 515	Medical Genetics and Bioinformatics	C	3	-
BU-MLS 532	Diagnostic Cytology	C	-	2
BU-MLS 533	Immunohistochemistry	C	2	-
BU-MLS 535	Cytogenetics	C	2	-
BU-MLS 536	Molecular Techniques and Forensic Histopathology	C	-	2
BU-MLS 538	Museum and Embalment Techniques	C	-	2
BU-MLS 539	Tumour Immunology	C	3	-
BU-MLS 541	Systemic Pathology	C	2	-
BU-GST 500	Adventist Heritage Seminar Series	C	-	3
BU-GST 540	Introduction to Digital Marketing	C	1	-
	TOTAL: (42 UNITS)		21	21

B.MLS. (Hons) MEDICAL LABORATORY SCIENCE**500 Level Courses**

HAEMATOLOGY AND BLOOD TRANSFUSION SCIENCE

Course Code	Course Title	Status Core/ Elective	Semester	
			1 st	2 nd
BU-GST 051	Citizenship Orientation		0	
BU-GST 052	Citizenship Orientation			0
MLS 502	Laboratory Posting III	C	-	2
MLS 503	Practical Exercises III	C	2	-
MLS 590	Research Project	C	-	6
MLS 505	Seminar	C	2	-
MLS 508	Clinical Chemistry II	C	-	2
MLS 510	Medical Laboratory Haematology II	C	-	2
MLS 512	Medical Laboratory Histopathology II	C	-	2
MLS 514	Medical Laboratory Microbiology II	C	-	2
BU-MLS 515	Medical Genetics and Bioinformatics	C	3	-
BU-MLS 535	Cytogenetics	C	2	-
BU-MLS 540	Immunohaematology	C	2	-
BU-MLS 543	Forensic Haematology	C	2	-
BU-MLS 545	Molecular Techniques in Haematology	C	3	-
BU-MLS 546	Phlebotomy	C	-	2
BU-MLS 547	Pediatrics Haematology	C	2	-
BU-MLS 549	Haemostasis & Haemorheology and Microvascular Disorders	C	2	-
				-
BU- GST 500	Adventist Heritage Seminar Series	C	-	3
BU GST 540	Introduction to Digital Marketing	C	1	-
	TOTAL (42 UNITS)		21	21

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 (vowels and consonants, phonetics and phonology). 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 and concord, 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; Brainstorming, outlining, Paragraphing, Types of writing, Summary, Essays, Letter, Curriculum Vitae, Report writing, Note making and many others. 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. Report writing.

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 peoples 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; Nigerian Civil War). Concept of trade and economics of selfreliance (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 Mobilisation for SelfReliance, Social Justice and Economic Recovery (MAMSER), National Orientation Agency (NOA). Current socio-political and cultural developments in Nigeria.

BIO 101: General Biology I

(2 Units C: LH 30)

Learning Outcomes

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

1. explain cell's structure and organisations;
2. summarise functions of cellular organelle;
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 Lamarckism, 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
4. 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, the 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. rationalise the trends of atomic radii, ionization 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. draw 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 Le Chatelier'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 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. Structure of solids. Chemical equations and stoichiometry. Chemical bonding and intermolecular forces. 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, the 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 reactions;
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, nanochemistry. 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 the course the students should be able to:

1. state the general laboratory rules and safety procedures;
2. collect scientific data and correctly carrying out Chemical experiments;
3. identify the basic glassware and equipment in the laboratory;
4. state the differences between primary and secondary standards;

5. perform redox titration;
6. recording observations and measurements in the laboratory notebooks; and
7. analyse the 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 carrying 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. perform solubility tests on known and unknown organic compounds;
6. conduct 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.

COS 101: Introduction to Computing Sciences

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain basic components of computers and other computing devices;
2. describe the various applications of computers;
3. explain information processing and its roles in the society;
4. describe the Internet, its various applications and its impact;
5. explain the different areas of the computing discipline and its specialisations; and
6. demonstrate practical skills on using computers and the internet.

Course Contents

Brief history of computing. Description of the basic components of a computer/computing device. Input/Output devices and peripherals. Hardware, software and human ware. Diverse and growing computer/digital applications. Information processing and its roles in society. The Internet, its applications and its impact on the world today. The different areas/programs of the computing discipline. The job specialisations for computing professionals. The future of computing.

Lab Work: Practical demonstration of the basic parts of a computer. Illustration of different operating systems of different computing devices including desktops, laptops, tablets, smart boards and smart phones. Demonstration of commonly used applications such as word processors, spreadsheets, presentation software and graphics. Illustration of input and output devices including printers, scanners, projectors and smartboards. Practical demonstration of the Internet and its various applications. Illustration of browsers and search engines. How to access online resources.

PHY 101: General Physics I (Mechanics)

(2 Units C: LH 30)

Learning Outcomes

At the end of the course, student 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, 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 & Magnetism)

(2 Units C: LH 30)

Learning Outcomes

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

1. describe the electric field and potential, and related concepts, for stationary charges;
2. calculate electrostatic properties of simple charge distributions 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 the course, the student 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 and many others, covered in PHY 101 and PHY 102. 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, the student 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 practical course is a continuation of PHY 107 and is intended to be taught during the second semester of the 100 level to cover the practical aspect of the theoretical courses that have been covered with emphasis on quantitative measurements. The treatment of measurement errors, and graphical analysis. However, emphasis should be placed on the basic physical techniques for observation, measurements, data collection, analysis and deduction.

BU-BIO 114: Health and Nutrition Biology

(2 Units; C; LH 30)

Learning Outcomes

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

1. Mention four (4) roles of the macronutrients and micronutrients in the body.
2. List five (5) importance of plant-based diets and healthy lifestyle practices.
3. Evaluate and identify five (5) health benefits of plant-based diets among Seventh-day Adventists, including the Adventist Health Studies.
4. Enumerate three (3) dietary guidelines promoted by the Seventh-day Adventist Church and discuss their practical application.
5. State five (5) roles of nutrition in preventing chronic diseases.
6. Develop a healthy cooking and meal plan that incorporate more plant-based foods.

Course Contents

Introduction to Health and Nutrition Biology. Biblical Basis for Health and Nutrition. Overview of the Seventh-day Adventist Church and its emphasis on health and wellness. Basic principles of nutrition and their role in the body. Vegetarianism and Veganism. Benefits of a plant-based diet. Adventist Health Studies: research on the health benefits of plant-based diets among Seventh-day Adventists. Adventist dietary guidelines for a Healthy Lifestyle. Nutrition and disease prevention. Nutrition and mental health. Nutrition and sustainability. Healthy cooking and meal planning. Food Safety and Hygiene. Mind-Body Connection in Health and Healing. Aging and Health. Health education and promotion in Seventh-day Adventist institutions. Community Health and Service.

BU-GST 105: Use Of Library and Study Skills

(2 Units C: LH 30)

Learning Outcomes

Upon completion of this course, students would have learnt to:

1. Explain the origin of three writing materials from the ancient to information age
2. Explain four types of libraries
3. Explain six importance of libraries in the educational and learning process
4. Explain five importance of Libraries and Information in the Educational and Learning Process
5. Discuss five Sections in the Library and functions performed
6. Explain two Classification Scheme & Library Catalogues
7. Explain four Information Search Tools
8. State four social issues relating to Libraries and rules for users
9. Explain two reference styles

Course Contents

Ancient period to Information age. Evolution of writing Materials. Concept of library. Types of library and information centers. Sections in the library. Parts of book. Electronic Information Resources. Bibliographic entries. Bibliographic control. Library Catalogue. Filling Shelving. Shelve reading. Library automation. Library software applications. Information networking and sharing. How to study. The brain. Memory retention mechanism. Search tools. Information retrieval tools. Reference styles. Social issues relating to Libraries and Information centers. Preparation for academic success.

BU – GST 112: Health Principles

(1 Unit C: LH 15)

Learning Outcomes

On completion of the course, students should be able to:

1. Define health according to World Health Organization
2. State five (5) components and the human body and their function
3. Describe at least three (3) determinants of health and well-being
4. List five (5) factors that mental health
5. Explain two (2) current health trends

Course Contents

Meaning of health. Ecology of human disease. Biblical foundation health. Determinants of health. Basic human anatomy and physiology. Body defense mechanism. Element of nutrition. Health implication of nutrition for health. Personal and environment hygiene. Environmental pollution. Substance Abuse. Health implication of substance abuse. Mental health and well- being. Stress coping mechanism. Body pH and Health. Current trends in Health. Sport health and physical activity.

BU-GST 120: ICT Fundamentals and Office Productivity Management (1 Unit C: LH 15)

Learning Outcomes

On completion of the course, students should be able to:

Word:

1. creating text documents
2. editing and formatting the existing documents
3. making a text document interactive with different features and tools
4. graphical documents, comprising images
5. used by Authors and Researchers
6. detect grammatical errors in a text document.

Excel:

1. perform data entry and storage
2. collection and Verification of business data
3. administrative and managerial duties
4. accounting and budgeting
5. data Analysis
6. reporting + Visualizations
- i. forecasting.

PowerPoint:

1. create presentations from scratch or a template
2. add text, images, art, and videos
3. select a professional design with PowerPoint Designer.

Course Contents**Word:**

Getting started with word. Adding tables. Controlling page appearance. Formatting text and paragraphs. Inserting graphic objects. Managing lists. Preparing to publish. Working more efficiently. Controlling the follow of a document. Customizing formats using styles and themes. Inserting content using quick parts. Organizing content using tables and charts. Simplifying and managing long documents. Using mail merge. Using templates to automate document formatting.

PowerPoint:

Getting started with PowerPoint. Preparing a PowerPoint presentation. Performing advanced text editing operations. Adding graphical elements to your presentation. Modifying objects in your presentation. Adding tables to your presentation. Adding charts to your presentation. Preparing to deliver your presentation. Adding SmartArt math equations to a presentation. Collaborating on a presentation. Customizing a slide show. Customizing design templates. Modifying the PowerPoint environment. Securing and distributing a presentation. Working with media and animations.

Excel:

Getting started with excel. Formatting a worksheet. Managing workbooks. Modifying a worksheet. Performing calculations. Printing workbooks.

BU- GST 126: Life and Teaching Of Christ The Messiah

(2 Units C: LH 30)

Learning outcomes

On completion of the course, students should be able to:

1. Assess the historicity of Jesus Christ, using at least five (5) biblical and extant literature;
2. Explore five (5) religio-political and socio-economic events in Palestine during Jesus' time.
3. Enumerate five (5) evidences that Jesus Christ came at the fullness of time;
4. Identify at least three (3) theological implications of the Incarnation;
5. Contrast between Jewish and Jesus' views of the Kingdom;
6. Enumerate any seven (7) teachings of Jesus Christ;

7. Describe any five (5) events leading to Jesus' arrest and crucifixion;
8. Enumerate any five (5) theological implications of Jesus' death and resurrection;

Course Contents

The world which Jesus met and worked in. God with Us. Historicity of Jesus Christ. The fullness of Time. Childhood and Youth of Jesus. The Baptism of Jesus. The temptation of Jesus. The Gospel of the kingdom. The Ministry Jesus Christ. The Mission of Jesus Christ. Jesus' Teaching Methods. The Sermon on the Mount. The last days of Christ earthly life. Gethsemane Experience. Jesus' Arrest. Judgement of Jesus. The Crucifixion. Burial and Resurrection. Jesus' Appearances. Theological implications of Jesus Resurrection and teachings.

BU-MTH 101: Elementary Mathematics (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, Subset, 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; subset, union, intersection, complements, venn diagrams. Real numbers; Integers, Rational and Irrational numbers, mathematical, induction, 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.

BU-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. Explain 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

Calculus: Function of a real variable, graph, 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, definite integrals. Application to areas and volumes.

200 LEVEL

GST 212: Philosophy, Logic and Human Existence

(2 Units C: LH 30)

Learning Outcomes

A student who has successfully gone through this course should be able to:

1. enumerate the basic features of philosophy as an academic discipline;
2. identify the main branches of philosophy & the centrality of logic in philosophical discourse;
3. describe 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 assess 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 and many others.

ENT 211: Entrepreneurship and Innovation

(2 Units C: LH 30)

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.

MCB 201: Introduction to General Microbiology

(2 Units C: LH 30)

Learning Outcomes

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

1. explain the basic concepts and scope of microbiology;
2. know the scope of microbiology layout of microbiology laboratory equipment and reagents in microbiology; and
3. explain the theory behind basic protocols in a microbiology laboratory.

Course Contents

The Kingdom Protista Organisation differences in eucaryotic cells classification and nomenclature of micro-organisms. Bacterial cell form, structure nutrition reproduction and metabolism. Bacterial genetics. A typical prokaryotic cell Viruses. Encaryotic Micro-organismfungi microbial control, microbes in food, water and environment. Bacterial infection and virulence. Phagocytosis. Introduction to pathogenic microbiology. Laboratory animals, types breeding and uses.

BCH 201: General Biochemistry I

(2 Units C: LH 30)

Learning Outcomes

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

1. explain the structure of different macromolecules in biological system;
2. identify types of chemical reactions involving these macromolecules;
3. explain the various methods of isolation of these macromolecules;

4. estimate the effects of acids and alkalis on the macromolecules;
5. describe purification of macromolecules; and
6. discuss quantification the various macromolecules.

Course Contents

Introductory chemistry of amino acids; their properties, reactions and biological functions. Classification of amino acids: neutral, basic and acidic; polar and non-polar; essential and nonessential amino acids. Peptides. Introductory chemistry and classification of proteins. Biological functions of proteins. Methods of their isolation, purification and identification. Primary, secondary, tertiary and quaternary structures of proteins. Basic principles of tests for proteins and amino acids. Introductory chemistry of carbohydrates, lipids and nucleic acids. Nomenclature of nucleosides, and nucleotides; effects of acid and alkali on hydrolysis of nucleic acids.

BCH 202: General Biochemistry II

(2 Units C: LH 30)

Learning Outcomes

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

1. explain the structure of the cell including its components;
2. discuss the interrelationship between different organelles of the cell;
3. recognise the differences between plant and animal cells;
4. isolate the various organelles of both plant and animal cells; and
5. discuss the influence of hydrogen ion concentration on cellular function.

Course Contents

The cell theory. Structures and functions of major cell components. Cell types, constancy and diversity. Cell organelles of prokaryotes and eukaryotes. Chemical composition of cells. Centrifugation; Methods of cell fractionation. Structure, function and fractionation of extracellular organelles. Water, total body water and its distribution. Regulation of water and electrolyte balance. Disorder of water and electrolyte balance. Acidity and alkalinity, pH and pK values and their effects on cellular activities.

BCH 203: General Biochemistry Practical I

(1 Unit C: PH 45)

Learning Outcomes

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

1. describe the laboratory experiments designed to reflect the topics covered;
2. explain the laboratory procedures used in the study of various biochemical processes.

Course Contents

Laboratory experiments designed to reflect the topics covered in BCH 201 and BCH 202. Introduction to laboratory methods and procedures employed in studying biochemical processes.

ANA 205: Anatomy of Upper and Lower Limbs for Allied Health (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. define fundamental anatomical terminology and discuss the anatomical position;
2. describe the anatomy of the musculoskeletal system, including the axial skeleton; appendicular skeleton, appendicular and axial muscles, and arthrology;
3. describe the general features of the bones of the upper and lower limbs;
4. identify the major muscles of the upper and lower limbs;
5. explain the types and structure of the joints of the upper and lower limbs;
6. correlate between the attachment of the muscles and their functions on the different joints;
7. identify the major nerves of the upper and lower limbs;
8. describe the functional components of each of the major nerves and its distribution;
9. identify and describe the course of the major superficial veins of the upper and lower limbs; and
10. name the major arteries of the upper and lower limbs.

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 organization of body system. Cutaneous innervation of the upper limb; pectoral region; breast; axilla; shoulder region; arm and cubital fossa; flexor compartment of forearm; extensor compartment of forearm; hand; venous and lymphatic drainage of the upper limb. Applied anatomy of nerves; blood supply of the upper limb. Cutaneous innervation of the lower limb; femoral triangle; adductor canal and medial side of the thigh; gluteal region; back of the thigh, popliteal fossa; extensor compartment of the leg and dorsum of the foot; peroneal and flexor compartment of the leg; sole of the foot, arches of the foot; mechanism of walking; venous and lymphatic drainage of the lower limb; applied anatomy of the nerves and blood supply to the lower limb.

ANA 202: Histology of Basic Tissues

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. name common current histological techniques;
2. enumerate the principles, techniques and functional applications of Histology;
3. define and explain the cell in relation to its environment, surface components and content;
4. explain the interrelationship and interdependency between cell structures and functions; and
5. identify the microscopic appearance of tissues such as muscle, cartilage, etc in relation to their staining.

Course Contents

Introduction to histology; Method of study in histology; Cell Membrane, Cellular organelles; Cell dynamics and cell cycle. Cytogenetics. Histochemistry and cytochemistry. Introduction to recombinant DNA; In situ hybridization histochemistry. Cell dynamics and cycle. Basic tissues of the body, the epithelial, connective tissues, muscle and nervous tissue. The microanatomy of the four basic tissues, namely: epithelial tissue, including glandular tissue, connective tissue, muscular tissue, and nervous tissue. Covering and Lining Epithelia. Glandular Epithelia. Connective tissue. Bone, Bone formation and Joints. Blood. Muscle. Nervous tissue (PNS). Nervous tissue (CNS). Cardiovascular system. Respiratory system. Integumentary system. Liver, Gallbladder and Pancreas. Gastro-intestinal system. Lymphatic tissue and the Immune system. Endocrine system. Urinary system. Female reproductive system. Male reproductive system. Eye.

ANA 203: General and Systemic Embryology

(2 Units C: LH 30)

Learning Outcomes

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

1. explain how the embryo forms from the zygote;
2. discuss the role of cleavage and gastrulation in animal development;
3. demonstrate understanding of embryology and significance of prenatal diagnostic methods;
4. describe structural features of primordia in tissue and organs at different developmental stages;
5. define risk periods in histo- and organogenesis; and
6. analyse the most often observed developmental anomalies.

Course Contents

Spermatogenesis, oogenesis; ovarian follicles; ovulation; corpus luteum; menstruation; uterine cycle; hormonal control of uterine cycle; fertilization; cleavage; implantation; reproductive technologies-IVF/surrogacy/embryo transfer; embryo manipulation & potency/twinning; molecular embryology and transgenesis; gastrulation; notochord, neurulation; derivatives of the germ layers; folding of the embryo; fetal membranes; placenta; development of limbs and teratology. Growth and perinatology; congenital malformations – general introduction. The cardiovascular system, skin, structure of the nails and hair. Macrophagic system; cellular

immunology; lymphoid organs; glands – endocrine and exocrine. Respiratory system. Digestive system. Urinary and genital systems. Electron micrograph studies of each organ.

PIO 201: Introductory Physiology and Blood

(2 Units C: LH 30)

Learning Outcomes

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

1. describe the composition of a cell membrane;
2. explain how a potential difference across a membrane will influence the distribution of a cation and an anion;
3. describe how transport rates of certain molecules and ions are accelerated by specific membrane transport proteins;
4. distinguish between active (primary and secondary) transport, facilitated diffusion, and passive diffusion based on energy source and carrier protein involvement;
5. identify the mechanisms and role of selective transporters for amino acids, neurotransmitters, nutrients, etc.;
6. explain the general concepts of homeostasis and the principles of positive and negative feedback in physiological systems;
7. identify the site of erythropoietin production, the stimulus for its release, and the target tissue for erythropoietin action;
8. discuss the normal balance of red blood cell synthesis and destruction, including how imbalances in each lead to anemia or polycythemia;
9. list and differentiate the various types of leukocytes;
10. describe the role of thrombocytes in haemostasis; and
11. list clotting factors and discuss the mechanism of anti-coagulants.

Course Contents

Introduction and history of physiology. Structure and functions of cell membranes. Transport process. Special transport mechanism in amphibian bladder, kidney, gall bladder, intestine, astrocytes and exocrine glands. Biophysical principles. Homeostasis and control systems including temperature regulation. Biological rhythms. Composition and functions of blood. Haemopoiesis. WBC and differential count. Plasma proteins Coagulation, fibrinolysis and platelet functions. Blood groups – ABO system – Rh system. Blood transfusion – indication for collection and storage of blood, hazards of blood transfusions. Reticulo- endothelial system. Immunity and immunodeficiency disease and HIV.

PIO 203: Physiology of Excitable Tissues

(2 Units: C: LH 30)

Learning Outcomes

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

1. list the steps in excitation-contraction coupling in skeletal muscle;
2. describe the structure of the neuromuscular junction;
3. list some intracellular factors that can cause muscle fatigue;
4. describe the distinguishing characteristics of multi-unit and unitary smooth muscles;
5. explain the steps in the excitation-contraction coupling mechanism in cardiac muscle and compare with skeletal muscle including different mechanisms for sarcoplasmic reticulum calcium release;
6. explain how the resting membrane potential is generated
7. state the Nernst equation, and indicate how this equation accounts for both the chemical and electrical driving forces that act on an ion;
8. discuss the mechanisms by which an action potential is propagated along both nonmyelinated and myelinated axons;
9. describe the principle of the voltage clamp and how it is used to identify the ionic selectivity of channels; and
10. discuss the disorders that can occur at the neuromuscular junction.

Course Contents

Structure and classification of muscles, excitation and contraction theories and principles involved in muscles contraction, resting membrane and action potentials. Generation of impulses in excitable tissues. Nerve and neuromuscular transmissions. Simple reflex and spinal reflexes. Spinal cord ascending, descending pathways. Receptors. Thalamus-sensory motor cortex. Control of posture and movement. The reticular activating system, sleep, neural centers regulating Visceral functions. Neurophysiological basis of instinctive behaviour, conditioned reflexes learning, and temperature regulation. Sympathetic and parasympathetic pathways. Role in the various system especially cardiovascular, respiratory and gastro intestinal.

PIO 214: Introduction to Cardiovascular and Respiratory Physiology (2 Units C: LH 30)

Learning Outcomes

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

1. state Starling's law of the heart and describe the application of the law in keeping the output of the left and right ventricles equal;
2. describe how ionic currents contribute to the four phases of the cardiac action potential;
3. explain the ionic mechanism of pacemaker automaticity and rhythmicity, and identify cardiac cells that have pacemaker potential and their spontaneous rate;
4. identify neural and humoral factors that influence their rate;
5. describe the various phases of ventricular systole and ventricular diastole;
6. describe the timing and causes of the four heart sounds;
7. explain why the ECG tracing looks different in each of the 12 leads;
8. explain the principles underlying cardiac output measurements using the Fick principle, dye dilution, and thermodilution methods;

9. list the factors that shift laminar flow to turbulent flow;
10. describe the relationship between velocity, viscosity, and audible events, such as murmurs and bruits;
11. describe how arterial systolic, diastolic, mean, and pulse pressure are affected by changes in a) stroke volume, b) heart rate, c) arterial compliance, and d) total peripheral resistance;
12. define the Starling equation and discuss how each component influences fluid movement across the capillary wall;
13. list the anatomical components of the baroreceptor reflex;
14. explain three positive feedback mechanisms activated during severe hemorrhage that may lead to circulatory collapse and death;
15. define compliance and identify two common clinical conditions in which lung compliance is higher or lower than normal;
16. list the factors that determine total lung capacity, functional residual capacity, and residual volume;
17. define surface tension and describe how it applies to lung mechanics, including the effects of alveolar size and the role of surfactants;
18. explain how the shape of the oxyhemoglobin dissociation curve influences the uptake and delivery of oxygen;
19. list the forms in which carbon dioxide is carried in the blood; and
20. identify the regions in the central nervous system that play important roles in the generation and control of normal respiration.

Course Contents

The heart; events of the cardiac cycle. Control of cardiac contractility. Cardiac electrophysiology. Properties of cardiac muscles. Cardiac output - measurement and control. Haemodynamics of circulation. Arterial blood pressure and its regulation. Cardiovascular reflexes. Peripheral resistance and local control of the circulation. Regional blood flow. Cardiovascular changes in exercise, haemorrhage and shock. Respiratory physiology – functions of upper respiratory tract. Mechanics of respiration including compliance. Surfactant. Lung volume and capacities. Pulmonary gas exchange. Blood gas transport. Pulmonary function tests. Nervous and chemical control of respiration. Response to hypoxia, high altitude, exercise and artificial respiration.

PIO 216: Gastrointestinal Physiology

(2 Units C: LH 30)

Learning Outcomes

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

1. compare and contrast the regulation of gut function by nerves, hormones, and paracrine regulators;
2. identify the cell type and anatomical location of the endocrine cells secreting major GI hormones, such as gastrin, secretin, cholecystinin (CCK), GLP-1, GLP-2, leptin, and motilin;
3. list the physiological functions of the components of saliva;

4. describe the role of HCl in the gastric digestion of carbohydrates and protein, and how pepsinogen is activated;
5. list the mechanisms contributing to gastric mucosal defense and how they can be compromised by drugs or pathogens;
6. list the stimuli that release secretin and CCK and explain the route by which these regulatory peptides stimulate the pancreas;
7. describe the cellular mechanisms for the hepatic uptake, conjugation, and secretion of bile salts and bilirubin;
8. describe the sequential digestion of ingested starch by enzymes of the salivary glands, pancreas, and the intestinal apical membrane;
9. describe the mechanisms and molecules mediating the solubilization and digestion of lipids in the small intestine; and
10. describe the disorders of motility that can lead to gastroparesis, achalasia, diarrhea, constipation, megacolon and irritable bowel syndrome.

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, Physiologic anatomy of the liver and biliary system including their functions, Disorders of G.I.T, The gut as an endocrine organ. Nutrition: energy and other dietary requirements. Basal metabolic rate. Nitrogen balance. Amino acid deficiency. Hormonal control of nutritional needs, vitamins, mineral mechanisms. Food value of local foodstuffs. Diet sheets and nutritional deficiency states.

MLS 201: Introduction to Medical Laboratory Science

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. define safety awareness for Medical Laboratory Personnel;
2. describe steps used as precautionary measures;
3. select the correct means of disposal of waste generated in the Medical Laboratories;
4. list the types of samples used in the clinical laboratories;
5. identify the preanalytical, pre-collection, collection and post collection variables that can adversely affect laboratory results;
6. list the proper drawing order for collection tubes; and
7. describe the general steps for processing samples.

Course Contents

General introduction to Medical Microbiology, immunology and Histopathology, specimen collection, reception and registration. Safety precaution in Medical Microbiology Immunology and Histopathology Laboratories. Microscopy use and care of the microscope and other equipment

sterilisation-principles and techniques. Glassware-care and maintenance. Refrigeration-Principle, uses and care. General introduction to clinical Chemistry, Haematology and Blood Transfusion Sciences. Specimen collection reception and registration. Storage and disposal of specimens. Specimen containers. Safety precaution in the chemical pathology, Haematology and Blood Bank Laboratories. Handling of Laboratory animals.

STA 201: Biostatistics

(2 Units C: LH 30)

Learning Outcomes

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

1. explain the scope for statistical methods in health science;
2. define the measures of location partition and dispersion;
3. explain the elements of probability, probability distribution;
4. describe the test for hypotheses concerning population means proportions and variances;
5. compute for regression and correlation as well as conduct some non-parametric tests reference to contingency table analysis; and
6. explain the elements of design of experiments and analysis of variance.

Course Contents

Aims, characteristics and application of biostatistics in clinical and preventive medicine. Statistical data in bio-medical science-samples, population, variables, frequency distribution, vital and descriptive statistics, measurement of central tendencies-mean, median, mode, dispersion and presentation of data probability distribution, Hypothetical tests of statistical significance. Analysis of variance. Regression and correlation. Experimental designs and clinical trials.

ANA 204: Anatomy of Thorax, Abdomen, Pelvis & Perineum (3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. identify the bones and bony markings of the thorax, abdomen, pelvis and perineum;
2. list the nine regions and four quadrants and the principal organs and structures that lie deep to them and which can be palpated in those regions;
3. describe the muscular components of the anterior abdominal wall, blood supply and innervation of the anterior abdominal wall;
4. identify the arteries, veins and lymphatics of the thorax, abdomen, pelvis and perineum; be able to list the main branches of the aorta and their territories; and describe the disposition of the main veins in the abdomen;
5. describe the parts, position, vertebral levels and surface markings of the stomach and duodenum as well as the position, vertebral levels and surface markings of the pancreas, spleen, liver and gall bladder;
6. describe the greater and lesser omenta and the lesser sac;

7. describe the disposition of the jejunum and ileum; describe the surface anatomy of the caecum, ascending colon, transverse colon, descending colon and sigmoid colon;
8. describe the anatomy of the pelvic diaphragm, its midline raphe, perineal body, attachment points and the structures passing through it in males and females;
9. describe the anatomy of the ischio-anal fossa;
10. describe the anatomy and relations of the ovary, uterine tubes, uterus, cervix and vagina, including their peritoneal coverings;
11. describe the anatomy and neurovascular supply of the clitoris, vulva and vagina; the anatomy of the urogenital diaphragm and perineal ‘pouches’;
12. describe the origin, course and distribution of the pudendal nerves and the sites of pudendal nerve block;
13. describe the lymphatic drainage of the foregut, pelvic and perineal organs;

Course Contents

Introduction to the trunk; thoracic cage; intercostal space; thoracic cavity; pleural cavities; lungs; mediastinum general; anterior & superior mediastinum; middle; mediastinum – heart and pericardium; heart – applied anatomy; posterior mediastinum. General anatomy of abdomen and abdominal regions; anterior abdominal wall muscles; inguinal canal – inguinal and femoral hernias; peritoneal cavity and spaces; abdominal oesophagus, stomach, duodenum, spleen, small intestine, large intestine, appendix; portal venous system; portocaval anastomoses; liver and gallbladder. Pancreas and biliary apparatus; kidneys, suprarenal glands, and ureters; diaphragm; posterior abdominal wall; aorta and inferior vena cava; posterior abdominal wall muscles; lumbosacral plexus; bony and ligamentous pelvis; pelvic diaphragm (floor); male reproductive organs; female reproductive organs; male and female external genitalia; perineum; rectum and anal canal; pelvic blood vessels; abdomino- pelvic nervous system.

BU-ANA 218: Gross Anatomy of Head, Neck and Neuroanatomy(3 Units C: LH 30;

PH 45)

Learning Outcomes

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

1. recognize anatomical structures correctly and comprehend the topographic anatomy of the head and neck region;
2. identify major musculoskeletal elements of the skull, face, ear, nasal cavity, pharynx, larynx, oral cavity, and cervical and thoracic regions;
3. identify the major blood vessels and venous drainage which supply the features of the head, neck and the nervous system
4. describe the anatomy of the central and peripheral nervous systems; and classifying them: describe the structure and function of the brain, spinal cord, neural pathways and cranial nerves; and explain the ultrastructure of neurons and glia and the major cytoarchitectural features of the brain and spinal cord;

5. identify the major features of the brain and spinal cord using prosected specimens, models and cross-sectional images; and
6. describe the structural and functional relationships between these structures and to apply this knowledge to further research and clinical studies.

Course Contents

Cervical vertebrae, bones of the skull; interior of the cranium mandible; scalp temple and face I; scalp temple and face II; side of the neck-posterior triangle; anterior triangle of neck; cranial cavity, meninges, venous sinuses, hypophysis cerebri, cranial nerves; deep dissection of neck including thyroid and parathyroid glands; deep dissection of blood vessels & nerves of neck paravertebral region. Orbit and lachrymal apparatus; side of neck/posterior triangle; anterior triangle of the neck; parotid, temporal & infratemporal regions; submandibular region; mouth, pharynx and soft palate; nasal cavity/paranasal sinuses; larynx/tongue/eyeball; external, middle and internal ear.

introduction to the central nervous system; spinal cord morphology; spinal cord-tracts; lower medulla-pyramids; decussation, tubercles; upper medulla-olive, pons-basis pontis and middle cerebellar penduncle; pons tegmentum; midbrain-tectum; midbrain- tegmentum; cerebellum; diencephalon-thalamus; diencephalon-hypothalamus; epithalamus, subthalamus; ascending pathways and descending pathways, ventricles; pyramidal system; cerebral hemispheres, sulci and gyri, internal structure of cerebrum, basal ganglia; cortex- cytoarchitectonics, brodman areas, limbic system blood supply to the brain and spinal cord. Applied Anatomy.

BU-MLS 202: Laboratory Hazard Management I

(2 Units C: LH 30)

Learning Outcomes

On completion of the course, students should be able to:

1. Create one (1) plan for the hazard assessment and management.
2. Describe five (5) types of laboratory hazards.
3. State five (5) core safety elements.
4. Discuss three (3) principles and applications of containment technologies.
5. Explain four (4) procedures of waste management and segregation.
6. Evaluate five (5) key Good laboratory practices (GLP).

Course Contents

Concept and definition of medical laboratory hazards. Types of medical laboratory hazards. Biohazards. Bioagents. Biosafety. Biosecurity. Bioterrorism and threats. Mitigation and performance (MAP) model. Packaging and transportation of biologicals. Biological wastes. Decontamination and containment. Engineering control and laboratory equipment. Biosafety cabinets. Good Laboratory Practices. Incidence and recognition of risks. Reporting and responding

to risks. Risk assessment plan. Likelihood and severity of risks. Risk control and management program.

BU- GST 200: Communication in French

(1 Units C: LH 15)

Learning Outcomes

On completion of the course, students should be able to:

1. Abilities to greet
2. Knowing how to express time.
3. Knowledge of counting up 1000
4. Conjugaison of Etre and Avoir and be able to form sentences with the auxiliaries
5. Use pronoun instead of names
6. Make sentences in present tense with the verbs
7. Presentation of oneself in French Language.
8. Essay writing.

Course Contents

Alphabet. Salutation. L'heure. Le nombre. Le pronom personnel et l'auxiliaire Avoir et Être Les trois groupe verbes au présent de l'indicatif (premier groupe verbe, Deuxième groupe verbe, Troisième groupe verbe) Adjective possessive, Adjective Démonstratif etc et présentation.

BU- GST 215: Adventist Heritage

(3 Units C: LH 45)

Learning Outcomes

On completion of the course, students should be able to:

1. Explain the history of the Seventh-day Adventist Church.
2. Illustrate the systematic development of the Seventh-day Adventist Church.
3. State the contributions of at least five (5) pioneers of the Seventh-day Adventist Church.
4. Explain the seven (7) pillars of the Seventh-day Adventist church doctrine.
5. Describe the Seventh-day Adventists' concepts of holistic education, health reforms, and publishing ministries.
6. Identify at least eight (8) major contributions of Adventist education, health reforms, and publishing ministries.
7. Enumerate at least (7) areas in which the prophetic gift has shaped the mission of the Seventh-day Adventist Church.
8. Explain the meaning of Adventism and the aim of Adventist mission.

9. Describe the dynamics involved in the origin and growth of Seventh-day Adventism in Africa.
10. List at least eight (8) major contributions of the Seventh-day Adventism in Africa, with specific focus on national growth and development.

Course Contents

The historical and prophetic origin of the Seventh-day Adventist Church. Millerite roots, before 1844. The 1844 experiences. The development and organization of the Seventh-day Adventist Church. The era of doctrinal and organizational development (**1844 – 1863**). The era of institutional and lifestyle development (1863ff). The era of revival, reform, and expansion (**1888 – 1900**). The era of reorganization and Crisis (**1901 - 1910**). The era of worldwide growth (**1910 – 1955**). The challenges and possibilities of maturity (**1955**). The contributions of the pioneers and founders of the Seventh-day Adventist Church. The Pillars of Adventism. Adventists' concepts of holistic education. Healthcare and reforms. Publishing ministries. The prophetic gift in the Seventh-day Adventist Church. Significance of prophetic gift to the Adventist Mission. The purpose of Adventism. Adventist concept of mission. The origin, exploits and challenges of Seventh-day Adventism in Africa. Contributions of the Seventh-day Adventism in Africa.

BU - **GST 220: Origins and Science**

(1 Units C: LH 15)

Learning Outcomes

On completion of the course, students should be able to:

Course contents:

Religion and Science. Origin, Creation and the Flood. Scientific theories about Origin. Darwinism and theory of Evolution. Micro- and Macro-evolution. Geologic column, Fossil record and Scientific dating. Drawbacks to the theory of evolution and Darwinism. Cambrian explosion. Incompleteness of the Fossil record. Molecular machines and Irreducible complexity. Specificity and regulation of the DNA. Limitations of science. Alternatives to the theory of evolution. Intelligent Design (ID). The Flood. Aspects of Human origin. Cosmic origin and the Total environment. The uniqueness of the Planet Earth and Life. Science, Reasoning and Faith.

BU – **GST 221: Introduction to Agriculture**

(1 Unit C: LH 15)

Learning Outcomes

On completion of the course, students should be able to:

1. Recall the definition and discuss at least three (3) of the branches of agriculture.
2. Critique five important agricultural policies in Nigeria.
3. Discuss the objectives of Soil Science.
4. Discuss 5 physical properties of soil.
5. Discuss the characteristics of different soil types.
6. Discuss the reasons for losses of agricultural soil
7. Discuss different types of agricultural systems and practices with relevant examples in Nigeria
8. Describe the different types of crops with examples from across Nigeria
9. Discuss the problems facing livestock producers across Nigeria
10. Describe 3 common management practices in poultry/livestock production.

Course Contents

Introduction to Agriculture, its origin, branches and importance; Definition, scope and objectives & review of Agricultural policies; Introduction to soil science, its aims and objectives; Soil formation and soil physical properties; Erosion; Introduction to Crop Science (Agricultural systems/practices); Livestock production (importance & problems of livestock industry); Production practices of some selected ruminants, monogastric & non-ruminant herbivores; Non-conventional livestock production practices

BU- GST 290: Introduction to Data Analytics

(1 Unit C: LH 15)

Learning Outcomes

On completion of the course. Students should be able to do:

1. uncertainty analysis
2. data fitting
3. feed-forward neural networks
4. probability density functions
5. correlation functions
6. fourier analysis and FFT procedures
7. spectral analysis
8. digital filtering
9. hilbert transforms.

Course Contents

Connecting to data. Simplifying and sorting data. Organizing data. Posing a question. Wrangling data into a format. fixing data problems. exploring the data. finding patterns. building intuition. comparing measures. Statistics and forecasting. Dashboards and stories.

300 LEVEL

GST 312: Peace and Conflict Resolution

(2 Units C: LH 30)

Learning Outcomes

At the end of the 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; ZangoKartaf, Chieftaincy and Land disputes and many others. Peace Building, Management of Conflicts and Security: Peace & Human Development. Approaches to Peace & Conflict Management --- (Religious, Government, Community Leaders and many others.). Elements of Peace Studies and Conflict Resolution: Conflict dynamics assessment Scales: Constructive & Destructive. Justice and Legal framework: Concepts of Social Justice; The Nigeria Legal System. Insurgency and Terrorism. Peace Mediation and Peace Keeping. Peace & Security Council (International, National and Local levels) Agents of Conflict resolution – Conventions, Treaties Community Policing: Evolution and Imperatives. Alternative Dispute Resolution, ADR. Dialogue). Arbitration, c). Negotiation d). Collaboration and many others. Roles of International Organisations in Conflict Resolution. (a). The United Nations, UN and its Conflict Resolution Organs. (b). The African Union & Peace Security Council (c). ECOWAS in Peace Keeping. Mediaand 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, through case study and practical approaches, should be able to:

1. describe the key steps in venture creation;

2. spot 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 organisations and Business plan competition). Entrepreneurial marketing and e-commerce (Principles of marketing, Customer Acquisition & 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 & 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 and many others. Digital Business and E-Commerce Strategies).

MLS 301: Basic Clinical Chemistry

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. convert results from one unit format to another using si unit system;
2. describe the physiology and biochemistry of the gastric secretion;
3. list the test in urinalysis and microscopy profile;
4. describe how laboratory tests are used in these disorders;
5. discuss the mode of action of hormones in carbohydrate metabolism;
6. discuss the type of lipids;
7. describe the measurement of plasma lipid and lipoproteins;
8. outline the factors affecting synthesis of protein;

9. explain the functions of kidney; and
10. outline the causes of acidosis and alkalosis.

Course Contents

Traditional and S.I units in Clinical Chemistry; Reference values: Gastric function tests; Agents for Gastric stimulation. Ward procedures and Laboratory Investigation of Gastric Secretions. Intestinal function tests; Digestion and absorption; Causes of Malabsorption. Laboratory investigation of malabsorption. Renal function tests; functions of the kidney; Measurement of Renal plasma flow, Glomerular filtration rate – Creatinine clearance, Insulin clearance, Concentration and Dilution Tests; Urinary Acidification Tests, urine specific gravity/Osmolarity Dye Excretion test. Water and Electrolyte metabolism. Acid base balance; Definition and causes of acidosis and alkalosis; Blood buffers. Transport of blood gases; assessment of acid/base status. Lipids; definition and types of lipids; Formation of free fatty acids, ketone bodies and Lactate; Measurement of plasma lipids and lipoproteins. Plasma proteins and physiologic functions; factors affecting synthesis and catabolism. Methods for the determining of total protein in serum. Carbohydrate metabolism: Blood glucose homeostasis; hyperglycaemia diabetes mellitus – its causes and investigation; Hypoglycaemia – types causes and investigation.

MLS 302: Basic Haematology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss the basic concepts of origin, development and functions of blood cells;
2. describe the methods of Haemoglobin estimation;
3. describe the methods of cell counting;
4. state simple tests used in blood coagulation; and
5. explain blood films-normal and abnormal.

Course Contents

Origin, development and functions of blood cells. Synthesis and breakdown of haemoglobin. Methods of Haemoglobin estimation. Methods of cell counting. Absolute values. Introduction to Homeostasis. Principle and mode of action of common anticoagulants. Principle and components of Haematological stains. Simple tests used in blood coagulation. Blood films normal and abnormal. Practical Classes.

MLS 303: Basic Microbiology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the classification and nomenclature of microorganisms;
2. explain the general properties of bacteria, structure, growth and reproduction requirements;
3. state the general properties, structure and biology of viruses;
4. describe the characteristics and general features of fungi and their diseases; and
5. discuss about identification and demonstration of pathogens in the laboratory.

Course Contents

Scope of microbiology: Historical approach and many others. Classification and nomenclature of microorganisms. Introduction to the microbial world; Introduction to Bacteriology, Mycology, Virology and Parasitology (the protozoan).

Bacteriology: The general properties of bacteria, structure, growth, reproduction, requirements both environmental and nutritional. Aspects of Bacterial metabolism, bacterial genetics and variation. Sterilisation in Microbiology, bacteria in health and disease: Antibiotics and chemotherapy; infection and immunity; introduction to laboratory techniques and methods including serology.

Viruses: General properties, structure and biology of viruses, classification – various methods, reproduction, resistance, pathology, purification of viruses, propagation of viruses, immunity and diagnosis of viral infection, interferon and interference, inclusion bodies, cytopathic effects.

Viral-host interactions and identification.

Fungi: Morphology, groups and classification. Types of lesion and types of mycoses, growth requirements. Characteristics and general features of fungi and their diseases. Identification, and demonstration in the laboratory.

BU-BCH 330 Forensic Biochemistry for Allied Health Sciences (2 Units; Core, L = 30; P = Nil) **Senate-approved relevance**

Forensic Biochemistry will expose the students to essential knowledge required to analyse forensic evidence and provide scientific verifications. This is in line with the University's vision and mission statements to prepare graduates for excellence in service delivery in dispute resolution and forensic evidence.

Overview

Forensic biochemistry will expose students to the biochemical techniques employed in addressing legal questions. The course will cover the basis of tracing the origin of a particular substance, determining the paternity or relatedness of humans or animals, or tracking the spread of disease.

This course will prepare the students with the forensic methods and skills needed for relevant identification such as body fluids with an in-depth focus on the techniques and instrumentation used to extract, quantify, and analyse DNA and other samples.

Objectives

The objectives of this course are to:

1. Describe forensic biochemistry, its history, methods, and applications.
2. Relate basic genetics and population genetics to forensic biochemistry.
3. Describe human and non-human DNA typing techniques and DNA instrumentation.
4. Evaluate critical thinking and problem-solving approaches in forensic biochemistry.
5. Explain the theory and applications of relatedness in forensic investigations.
6. Describe the regulatory guidelines of forensic analyses.

Learning Outcomes

On completion of the course, students should be able to:

1. Describe at least two (2) techniques used in forensic biochemistry.
2. State at least two (2) applications of genetics and population genetics to forensic biochemistry.
3. Interpret at least two (2) forensic biochemistry experimental data and laboratory reports.
4. Describe at least two (2) applications of DNA typing and fingerprinting.
5. Review at least fifteen (15) research articles on relevant forensic investigations.

Course Contents

Introduction to forensic biochemistry. Historical aspects of forensic biochemistry. Cells and chromosomes. DNA replication. Serology. Presumptive and confirmatory testing. Forensic DNA extraction and quantification. Mitochondrial DNA. Forensic polymerase chain reaction and electrophoresis. Analysis of DNA by polymerase chain reaction techniques. Introduction to DNA

markers. Genome organization. Introduction to DNA profiling and fingerprinting. Forensic questions. Evaluation of DNA profiling. Forensic Databases. Quality assurance and quality control.

BU-BCH 332 Hormonal Biochemistry for Allied Health Sciences (2 Units; Core, L = 30, P = Nil)

Senate-approved relevance

Hormonal Biochemistry will equip the students with the basic knowledge of endocrinology to better understand hormone actions and how to better tackle hormone-associated disorders. The aims of this course align with the vision and mission of the University to train first-class servant leaders that are well-suited to investigate and proffer solutions to diseases associated with hormonal dysfunctions.

Overview

Hormonal Biochemistry will expose students to the mechanisms of action of chemicals called hormones, secreted by ductless endocrine glands in response to a biochemical signal received. Hormones play a vital role in the effective communication between different organs to adapt to changes in the environment.

The course will also introduce basic concepts of endocrinology and hormonal regulations. In addition, it will explain the classes of hormones, biosynthesis of amino acid-derived, steroid and polypeptide hormones and the role of intracellular mediators of hormonal signals and biochemical responses.

Objectives

The objectives of the course are to:

1. Explain endocrinology and the endocrine system.
2. Identify the classes and control of hormonal secretions, structures, and functions.
3. Explain the basic mechanism of hormonal actions and receptors.
4. Describe the molecular mechanism of steroids, thyroid, and polypeptide hormones.

5. State the biochemical roles of cAMP, glycogen phosphorylase, calcium ion, calcium-binding proteins, nitric oxide, inositol 1,4,5 triphosphate and diacylglycerol as intracellular second messengers.
6. Explain hormone agonists, partial agonists, and GTP-binding proteins.
7. Illustrate the biosynthesis of amino acids derived and steroid hormones.

Learning Outcomes

On completion of the course, students should be able to:

1. Outline three (3) classes, controls, structures, and functions of hormones.
2. Illustrate at least two (2) signal transduction pathways associated with hormone-receptor actions.
3. Review at least two (2) biochemical roles of hormone agonists and partial agonists.
4. Explain at least two (2) actions of heterotrimeric GTP-binding proteins in signal transduction.
5. Explain at least one (1) pathway required for the synthesis of amino acid-derived, polypeptide and steroid hormones.

Course Contents

Endocrinology and endocrine system. Hormonal Classes and functions. Control/regulation of hormonal secretions. The basic mechanism of hormonal actions and signal transduction. Hormone receptors. Molecular mechanism of hormones. Kinetic binding mode of action of hormones. Biochemical roles of cAMP. Glycogen phosphorylase. Calcium and calcium-binding proteins. Nitric oxide. Inositol 1,4,5 triphosphate and diacylglycerol. Hormone agonists and partial agonists. Heterotrimeric GTP-binding proteins. Phospholipases and protein kinases. Protein modules. Biosynthesis of hormones.

MLS 304: Basic Histopathology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss basic concepts of common fixing agents;

2. describe the uses of fixing agents in Histopathology laboratory;
3. explain basic histology of organs;
4. describe tissue sectioning procedures; and
5. conduct slide preparation and slides examination to illustrate normal and abnormal features.

Course Contents

Introduction to Histopathology. Fixation – Autolysis, bacterial decomposition. Effects of fixation, common fixing agents and their uses. Secondary fixation, post-fixation and post-chroming and post-mordanting. Fixation pigments, Decalcification – Aims and applications, decalcifying agents. Tests for clearing of decalcification. Dehydration, clearing and infiltration/embedding. Frozen and celloidin sections. Embedding media. Basic histology of organs. Principles and application of Exfoliate Cytology. Collection and fixation of specimens for cytological examination. Museum technique-colour restoration. Mounting in museum jars. Tissues and cellular injury inflammation. Healing and repairs. Gross appearance of diseased organs in routine post-mortem examination. Slide sections to illustrate common tumours.

MLS 305: Basic Immunology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. explain the basic concepts of immunology;
2. appreciate and explain animal vaccine production; and
3. appreciate and explain human vaccine production.

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

MLS 306: Laboratory Posting I

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. state hazards encountered in medical laboratories and the safety precautions to be applied to avoid disaster;
2. describe how to set up common laboratory equipment like microscope, autoclave and their application;
3. describe how laboratory specimens are collected and processed; and
4. discuss the basic organisation of a medical laboratory.

Course Contents

Laboratory hazards and precautions. General laboratory glassware and apparatus-composition of glass, cleaning of glassware, standardised glassware, general glassware. Apparatus autoclave, centrifuge. Production of chemically pure water, elementary microscopy; refraction, refractive index, principal focus of a converging lens, principal focus of a diverging lens, component of a microscope, setting up of a microscope, some do's and do not's of the microscope, micrometry, Dark ground microscope, Fluorescent microscope. Collection and reporting of specimens, ward etiquette, postage of specimen, preparation of specimen containers, swabs, collection of autopsy and biopsy specimens.

MLS 307: Practical Exercise I

(2 Units C: LH 15; PH 45)

The student is expected to carry out practical exercises in all the disciplines:

Clinical Chemistry: Titration: presentation of volumetric analysis. Methods for chloride determination. Determination of bicarbonate in plasma, percentage purity of carbonate. Determination of the composition of the mixture NaOH/Na₂CO₃, NaCl/HCl, specific gravity, reactions with ferric chloride, urobilinogen, bilirubin, indicant, myoglobin, cystine, protein, Bence-Jones protein, blood, reducing substances, ketone bodies, phenyl pyruvic acid.

Spectroscopy of plasma and urine CSF analysis – sugar, protein.

Haematology and BGS: Blood film, WBC count, haemoglobin estimation, Absolute values, eosinophil count, reticulocyte count. Osmotic Fragility. Blood grouping techniques, Antiserum titration, Anti-human globulin (AHG) direct and indirect, Antibody screening. Donor screening, secretor status.

Histopathology: Preparation of fixatives, removal of formalin pigments, testing of end point of decalcification using chemical methods. General tissue staining by haematoxylin and counterstaining with eosin. Demonstration of elastic and collagen fibres. Prussian blue reaction for iron in tissues. Gram and Ziehl-Nielsen (Z-N) staining methods. Use of automatic tissue processors. Microtome.

Medical Microbiology and Parasitology: Safety precautions in the Microbiology laboratory. Getting acquainted with basic tools of microbiologist. Preparation of films and basic staining techniques, the Gram stain, Ziehl-Nielsen stain, spores, capsule and negative staining procedures. Wet preparation and microscopy, Motility tests, Media preparation and culturing. Plate reading Demonstration of the ubiquity of micro-organisms especially bacteria from different environment. Recognition of different types of haemolysis. Sensitivity testing. Use of autoclave. Wet mount for parasites. Identification of trophozoites, cysts and ova of different protozoa and helminths in stool. Thin and thick films preparation for malaria microfilaria and Trypanosome parasites. Staining techniques: Giemsa, Wrights, Fields and Leishman Stains. Identification of Trichomonasspp, Paragonimus spp, Trichuris spp, Schistosoma spp, other Helminthes and protozoa of medical importance. Skin snips. Urine microscopy. Concentration techniques for stool and sputum for ova and cysts. Examination and recognition of Helminthes from tissue Biopsy.

MLS 308: Fundamentals of Blood Group Serology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss the components of ABO;
2. explain Rhesus blood group systems;
3. acquire the skill for blood grouping techniques;
4. appreciate the anomalies in ABO grouping;
5. identify the subgroups of ABO system and variants of Rh system; and
6. describe organisational structures of the Blood Bank, facilities and reagents.

Course Contents

ABO and Rhesus Blood Groups, Inheritance, distribution and Genetic Theory. Blood Grouping Techniques – principles, disadvantages and advantages. Preparation of antisera – antiserum titration, avidity, Potency and specificity. Plant lectins –Preparation and Standardisation of antisera from lectins such as Dolichos biflorus Anticoagulants used in BGS, ACD, CPD-CPA-A and many others. Modes of Action, Side effects. Blood Bottles (MRC) and Plastic Bags – Advantages and disadvantages. Donor Screening- using CuSO₄ method – other methods of screening. Preparation of blood products – cryoprecipitate, platelet rich plasma, packed cell fresh frozen plasma, fibrinogen and many others. Storage of blood and blood products – various methods, advantages and disadvantages Blood banking-organisation, structures, facilities and records. Blood group specific substances – synthesis, identification method(s) and application.

Quality control of physical, chemical and reagent. Practical/tutorials ABO and Rhesus grouping methods, Antiserum Titration DCT and ICT antibody screening.

MLS 309: Basic Medical Parasitology

(2 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain basic concepts of protozoa;
2. discuss the basic concepts of helminthes of medical importance;
3. describe the methods of demonstration of parasites in clinical samples;
4. discuss the basic concepts of Arthropods of medical importance; and
5. empower students with knowledge vectors of important diseases of man.

Introduction to the parasites. Classification of protozoa, (the amoebas, the ciliates, the flagellates, Nematodes. (Ascaris, Strongloides, Trichuris, guineaworm, hookworms, trichinella, Enterobius and many others). Life cycle and pathogenicity of Cestodes. (The tapeworms, Larval forms of cestodes). Life cycle and pathogenicity of the Trematodes (The Schistosome, Fasciola, Paragonimus, and many others). Methods of demonstration of parasites in blood, faeces, vagina, urine, urethra, pus from lung and liver, skin snips, and many others. Mechanisms of their disease production; Epidemiology and control of parasitic diseases. Arthropods of medical importance particularly members of the class Diptera, the crustaceans, Arachnida, Hexapoda, Myiasis and many others, their biology, life cycles and control. Life history as disease vectors; various diseases of importance transmissible by insects. Biology of mosquito in relation to transmission of malaria, filariasis, viral infections and many others.

MLS 310: Biomedical Engineering

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the basic concepts of principles of use and maintenance repair of common apparatus and laboratory equipment; and
2. acquire skill of repair of common apparatus and laboratory equipment.

Course Contents

Workshop practice. Principles of use maintenance and repair of common apparatus and laboratory equipment. Principles of applied and general electronics. Circuit diagrams, Computer programming. Improvisation. Glass blowing and construction of simple laboratory equipment. Design techniques, improvement on existing equipment, review and modifications of laboratory methods.

PHA 303: Basic Pharmacology and Toxicology:**(2 Units: C: 15 LH; 45 PH)****Learning Outcomes**

At the end of this course students should be able to;

1. identify the factors that influence the absorption of an orally administered drug;
2. relate the factors that influence the rate of drug elimination;
3. define drug distribution and factors that influence it;
4. describe the major toxicities of the drugs prescribed;
5. explain the role of the Medical Laboratory in the evaluation of exposure to poisons; and
6. define pathologic mechanisms of toxicants.

Course Contents

Scope of Pharmacology. Origin and sources of drugs, routes of administration of drugs, drug receptors and receptor isolation. Pharmacokinetics, absorption of drugs excretion, biotransformation. Structure-activity relationship. Mode of action of drugs. Types of drug action. Drug action in man-compliance, individual variations, presence of other drugs, genetic effects, tolerance and tachyphylaxis, effects of diseases, drug toxicity adverse drug reactions, drug dependence and drug interactions. Antimicrobial Pharmacology chemotherapeutic agents, antimetabolic base analogues, mitotic inhibitors, antibiotics, enzymes, alkylating agents and hormones. Radiation therapy, immune therapy and cancer therapy, synthesis and physiology of neurotransmitters Biochemical basis of depression. Marcotics-Mechanism of action. Fluorescent, radio and chromatographic methods in drug studies. Methods of evaluation of toxins mutagens and carcinogens.

BCH 304: Metabolism of Amino Acids & Protein**(2 Units C: LH 30)****Learning Outcomes**

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

1. illustrate why and how proteins are broken in cellular systems;
2. explain how to determine the molecular weight of proteins;
3. recognise the relationship between the urea cycle and other pathways of protein metabolism;
4. describe the differences between ketogenic and glucogenic amino acids; and
5. identify the role of inorganic nitrogen in protein synthesis and breakdown.

Course Contents

Amino acids as building blocks of proteins and the peptide bond as covalent backbone of proteins. Forces involved in the stabilization of protein structure. Protein isolation, fractionation, purification and characterization. Amino acid analysis of peptides and proteins. Methods for the determination of the sequence of amino acids in proteins. Protein biosynthesis, molecular weight determination of proteins. Techniques in protein biochemistry. Oxidative degradation of amino acids and metabolism of one carbon units. Ammonia toxicity and urea formation. Ketogenic and glucogenic amino acids. Biosynthesis of amino acids and some derivatives, the urea cycle; metabolism of inorganic nitrogen. Disorders of amino acid metabolism and polyamines

BCH 306: Analytical Methods in Biochemistry

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. explain the principles of instrumentation in biochemistry;
2. describe how the level of precision attained in analysis is dependent on the method employed;
3. discuss why a method is preferred in a particular biochemical investigation;
4. explain the theoretical basis of major instruments used in biochemical analyses; and
5. perform some specific analytical investigations.

Course Contents

Tissue and cell culture techniques, immunoassays, blotting and isotopic techniques. Principles, methodologies, instrumentation and applications of electrophoresis, manometry and centrifugation techniques. Chromatographic techniques including paper, thin layer, column, gas, and high-performance chromatographic techniques. Spectroscopic techniques including uv-visible, infra-red, nuclear magnetic resonance and mass spectrometry. Fluorimetry, polarographic including potentiometric and electrometric measurements. State-of-the-art equipment: gas chromatography-mass spectrometry, thermocycler, high performance liquid chromatography, nuclear magnetic resonance, fourier-transform infrared spectroscopy. This course includes laboratory practical classes, which will provide students the opportunity to practice the various

techniques and familiarise themselves with the types of equipment used for the techniques.

BU-BCH 316 Xenobiotic Metabolism and Toxicology

(3 Units; Core, L=45)

Learning Outcomes

On completion of the course, students should be able to:

1. State three (3) differences between xenobiotics and nutritional compounds.
2. List ten (10) sources of xenobiotics from natural and synthetic sources.
3. Outline at least two (2) histories and applications of toxicology.
4. Describe at least two (2) relevance of absorption, distribution, metabolism, and excretion dispositions of xenobiotics to human health.
5. Recall five (5) xenobiotic metabolic enzymes and their classification systems.
6. Design one (1) toxicity study for preclinical investigations.
7. Apply three (3) ethical principles of animal handling to research.

Course Contents

Xenobiotics. Sources of xenobiotics. Toxicokinetic of xenobiotics. Mechanism of xenobiotics toxicity. Oxidative stress-induced tissue damage. Principles and history of toxicology. Applications of toxicology and types of toxicologists. Xenobiotic disposition. Toxicity testing procedures. Dose-response relationships. Median lethal dose and toxicity ranking. Xenobiotic metabolism. Microsomal and non-microsomal enzymes. Classification of cytochrome P450s family. Factors influencing xenobiotic metabolism. Biochemistry of genotoxicity and immunotoxicity. Design of a toxicity study.

PI0 303: Endocrinology

(2 Units C: LH 30)

Learning Outcomes

On completion of this course, students should be able to:

1. list the hypothalamic factors that control the secretion of each of the anterior pituitary hormones and describe their route of transport from the hypothalamus to the anterior pituitary;
2. list the 3 major families of the anterior pituitary hormones and their biosynthetic and structural relationships;
3. describe the posterior pituitary lobes with respect to cell types, vascular supply, development, and anatomical function relative to the hypothalamus;
4. identify the steps in the biosynthesis, storage, and secretion of tri-iodothyronine (T3) and thyroxine (T4) and their regulation;

5. describe the regulation of parathyroid hormone secretion and the role of the calcium- sensing receptor;
6. identify the major hormones secreted from the endocrine pancreas, their cells of origin, chemical nature and physiological actions;
7. list the functional zones (one medullary and three cortical zones), innervation, blood supply, principal hormones secreted from each zone of the adrenal glands;
8. identify the major physiological actions and therapeutic uses of glucocorticoids;
9. list the major mineralocorticoids and identify their biological actions and target organs or tissues; and
10. identify the chemical nature of catecholamines, their biosynthesis, mechanism of transport within the blood, and how they are degraded and removed from the body.

Course Contents

Nature of hypothalamo-hypophyseal relationship. Synthesis, storage and release of the neurohypophyseal and adenohypophyseal hormones. Functions of the hypothalamus to include regulation of body temperature, thirst appetite and food intake. Regulation of adenohypophyseal function and higher autonomic control. Functions and control of the secretions of the pituitary, thyroid, parathyroid, pancreas and adrenal glands. Abnormalities of endocrine functions. Normal integration in the control of calcium and glucose metabolism.

PIO 309: Physiology Practical II

(1 Unit C: PH 45)

Learning Outcomes

On completion of this course, students should be able to:

1. acquaint themselves with the proper handling of laboratory equipment;
2. dissect laboratory animals and mount an isolated organs for a specific experiment;
3. use human subjects for some of the experiments like ECG, etc
4. take recordings of an experiment and interpret the results accordingly.; and
5. understand more laboratory management techniques and safety measures

Course Contents

Laboratory sessions on physiology experiments related to cardiovascular physiology, gastric secretions, respiratory, renal and neurological functions.

BU-MLS 311: Medical Genetics and Molecular Diagnostics

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. State five (5) applications of medical genetics and molecular diagnostics.

2. State three (3) mechanisms by which gene expression is regulated.
3. Highlight five (5) causes of cancer.
4. List four (4) basic laboratory skills and techniques used in medical genetics and molecular diagnostics.
5. Discuss four (4) bioethical issues in medical genetics in an international environment.
6. Explain four (4) methods of genetic diagnosis.
7. Describe five (5) challenges facing the practice of medical genetics and molecular diagnostics in Nigeria.

Course Contents

Basic Structure and Function of Cells. Investigation of the Eukaryotic Cell-Cycle. Interactions between Cells, Gametes, Fertilization and Signal Transmission Ways. Chromosome Structure and Function. Mendel'S Study of Heredity. Principles of Segregation and Independent Assortment. Gene Interactions. Mechanisms of Sex Determination and Sex Differentiation. Inheritance of Sex-Linked Genes. Linkage and Crossing-Over. Chromosome Mapping in Eukaryotes. Variations in Chromosome. Population Genetics. Genetic Alterations and Mutations. Risk Assessment and How to Calculate Risk of Being a Mutation Carrier. Cancer, Ageing and Apoptosis. RNA Technology in Cancer Drug Development. Genetic Diseases. Gene Mapping. Gene Replication and Expression. Nucleic Acid. Protein Structure and Metabolism. Molecular Transport, Trafficking, and Signaling. The Operon Models. Basic Laboratory Skills Used in Medical Genetics and Molecular Diagnostics. Genetic Counselling and Screening. Bioethical, Legal and Social Issues Relevant to Human Genetics. Factors to be Considered When Setting up a Molecular Diagnostic Laboratory. Challenges Facing the Practice of Medical Genetics and Molecular Diagnostics in Nigeria. Molecular Techniques.

BU – GST 310: Data Analysis Using Advanced Excel, SPSS, Power BI, Tableau (1 Units C: LH 15)

Learning Outcome

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

1. use pivot tables and pivot charts
2. use conditional formatting
3. remove duplicates
4. use XLOOKUP
5. prepare datasets for use in Power BI Desktop or Power BI Service
6. learn to manage big data prep using systems like Power Query
7. create visualizations within a Power BI Dashboard
8. read-in, enter, organize, and save data in a suitable way.
9. calculate/recode variables and prepare data for analysis.

10. conduct descriptive and basic inferential statistics.
11. be familiar with SPSS presentation of statistical output.
12. create and edit graphical displays of data.

Course Contents

Connecting to data. Simplifying and sorting data. Organizing data. Slicing data by date. Using multiple measures in a view. Showing the relationship between numerical values. Mapping data geographically. Get Started with Microsoft Data Analytics. Prepare Data in Power BI. Clean. Transform. Load Data in Power BI. Design a Data Model in Power BI. Create Measures using DAX in Power BI. Introduction to Tableau - Introduction. Visual Analysis. Visual Perception. Tableau Product Family. Connecting to Data. Data Terminology. Getting Dirty with Your Data-Introduction. Introduction to IBM SPSS Statistics. Reading Data. Defining Variable Properties. Working with the Data Editor. Modifying Data Values: Recode. Summarizing Individual Variables. Relationships between Variables. Selecting Cases for Analyses. Creating and Editing Charts. Working in the Viewer. Syntax Basics. Menus and the Help System. Project Work. Lab Work: Students will undertake the following tasks in the practical classes; Learn how to use excel to analyze data to understand data through natural language queries that allows to ask questions about data without having to write complicated formulas. In addition, students will learn how to use excel to analyze data to provide high-level visual summaries, trends, and patterns.

BU – GEDS 312: Family Life

(1 Units C: LH 15)

Learning Outcome

By the end of this course, the student should be able to:

1. Describe the Biblical foundation of family
2. Explain and appreciate the foundations of marriage
3. Identify the different marital relationships.
4. Develop a personal philosophy of family that encompasses personal, cultural and spiritual values.
5. Develop skills for successful marital and other interpersonal relationships and ways of
6. handling different marital conflicts
7. Effectively and positively apply the knowledge and skills acquired now and in the future
8. in the students' own family and
9. Help individuals, couples or families in making their marital relationships more enjoyable and less crises ridden.

Course Contents

Introduction, Definition of family, types of families, Definition of marriage, biblical foundations of marriage, purpose of marriage, characteristics of marriage, processes/stages of marriage Dating, Courtship & Engagement, Good and wrong reasons for dating, Enumerate the benefits of dating, factors to consider during courtship, practices to be avoided during courtship, factors to consider in readiness for marriage. Marriage as a major life decision, foundations of successful marriage, strategies for mate selection, Qualities to look for in a prospective wife, Qualities to look for in a

prospective husband, Relevance of domestic training in marriage, Inter-ethnic and inter-racial marriages, Marriage ceremonies and their characteristics, Forbidden marriages, Significance of bride price in African Culture, Honeymoon, Marital Adjustment: Sexual Behavior in marriage, Expected sexual behavior in marriage, Sexual dysfunctions,- Extra-marital affairs, causes, effects and control ,Marital Adjustment: Financial management in marriage and In-laws, Handling financial issues , Family finance and budgeting, Dealing with in-laws,- Siblings relationship in marriage, Establishing a New Home,- Building and furnishing the Home ,Family Roles and Responsibilities role of the father, mother, children Child bearing and child rearing, Family planning methods,- Biblical perspectives on parenting and child rearing, The four parenting styles, Conflict and conflict resolution, Causes of marital conflict, Basic steps on conflict resolution, Divorce in marriage, Causes, effect, control, Domestic Violence.

BU – GST 317: Fundamentals of Christian Faith

(3 Units C: LH 45)

Learning outcomes

On completion of the course, students should be able to:

1. Assess the history and development of the Old Testament and the New Testament Scripture;
2. Enumerate at least five (5) attributes of God;
3. Identify any seven (7) characteristic features of the Holy Spirit;
4. Assess any five (5) interconnectedness between the Law and grace;
5. Enumerate at least five (5) evidences of the biblical Sabbath;
6. Identify the symbolism and interpretation of the Daniel 2.
7. Assess at least four (4) signs of Christ's Second Coming;
8. Explain at least three (3) of the biblical ordinances in the scriptures
9. Describe any three (3) of the Christian lifestyles

Course Contents

Nature of Inspiration. God's Word. Authenticity of the Bible. Theology of God: His Names & Attributes. The Holy Spirit. Creation. Origin of Sin. Fall of Man. The Flood. Jesus' Incarnation and Ministry of Intercession. Law and Grace. The Sabbath. The Church and its Mission. Prophecy of Daniel 2. Second Coming. The Signs of the Second Coming. Manner of Jesus' Second Coming. Millennium and the New Earth. Biblical Ordinances. Christian Lifestyles. Prophetic Gift and the Church.

400 LEVEL

BU-GST 400: Religion and Social Ethics

(3 Units C: LH 45)

BU-GST 440: E- Project Management & Simulation

(1 Unit C: LH 15)

Learning Outcomes

Upon completion of the course students should be able to:

1. explain the project management processes
2. discuss the project management knowledge areas
3. demonstrate the formulas, charts, and theories of project management
4. calculate float for complex project network diagrams
5. memorize the formulas for earned value management
6. compare and contrast processes, knowledge areas, theories, and project management best practices

Course Contents

Defining Project Management Fundamentals. Initiating the Project. Planning the Project. Preparing to Develop the Project Schedule. Developing the Project Schedule. Planning Project Costs. Planning Human Resources and Quality Management. Communicating During the Project. Planning for Risk. Planning Project Procurements. Planning for Change and Transitions. Executing the Project. Executing the Procurement Plan. Monitoring and Controlling Project Performance. Monitoring and Controlling Project Constraints. Monitoring and Controlling Project Risks. Monitoring and Controlling Procurements. Closing the Project.

MLS 401: Laboratory Management and Functions and General Laboratory Practice (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss the basic concepts of medical laboratory design;
2. discuss planning and organisation;
3. explain accounts and budgeting, ordering, stock – card indexing;
4. describe storage and occupational hazards;
5. explain theory and practice of some common analytical techniques including tissue processing;
6. describe microscopy and other basic Microbiological Equipment use;
7. discuss the principles of Histological Equipment; and
8. discuss the principles and working of haematological and clinical chemistry equipment.

Course Contents

Principles and functions of Management. Personnel Management, Staff/Management relationships, stock control, record keeping. Management and administrative practices. Ecology of administration. Inventory and quality control Accounting and budgeting. Medicolegal aspects of medical laboratory Sciences. Professional ethics. Laboratory planning. Introduction to statistical procedures and biological research estimation, analysis of variance, tests of significance, goodness of fit, correlation and regression. Theory and practice of quality control – setting up quality control, various methods of quality control; factors affecting quality of output. Theory and practice of some common Analytical techniques including tissue processing, Microscopy and other basic Microbiological Equipment use, and principles of Histological Equipment, principles and working of haematological clinical chemistry Equipment; other applied techniques in the Medical Laboratory with emphasis on general Medical Laboratory Instrumentation. Practical Classes based on the above topics. General Review and appraisals of all subjects and practice of medical laboratory sciences to be examined as a common General paper.

MLS 402: Medical Laboratory Haematology I

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. acquire knowledge and skill on the laboratory management of different types of anaemia; and
2. acquire knowledge and skill on the laboratory identification of different Leukaemia.

Iron metabolism, folate and B2 metabolism. Nomenclature, classification and investigation of common haemoglobinopathies, haemolytic anaemias, myeloproliferative disorders, lymphoproliferative disorders, haemostasis and disorders of haemostasis; investigation of bleeding disorders. Bone marrow. Practical classes.

MLS 403: Medical Laboratory Histopathology I

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss basic concepts of the cytology of normal cells;
2. describe the epithelial cells; and
3. discuss atypical and malignant cells.

Course Contents

DNA – demonstration by Feulgen techniques. Silver impregnation methods. Genes and genetic code. Tissue culture techniques; chromosome analysis. Autoradiography – Definition and principle of organisation of a medical museum. Methods of colour maintenance. Fixation and storage of museum specimens. Special museum techniques such as Dawson’s Method. Principle of Photography Preparation of stained sections for micro photography. Preparation of specimens for preparation of stained sections for micro photography. Cytological normal cells. Histology of tissues. Atypical and malignant cells. Collection of cytological smears and processing and screening. Principles of general pathology. Systemic pathology. Gastrointestinal tract. Urogenital, cutaneous. Principle of Electron microscopy materials for electron microscopy. Respiratory – Tuberculosis. Nephropathy associated with infestations and infections. Embalming techniques and demonstrations and infections. Practical based on the topics.

MLS 404: Medical Laboratory Microbiology I

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the basic concepts of epidemiology of communicable diseases;
2. discuss disease spectrum; and
3. explain basic concepts of disease control.

Course Contents

Epidemiology of communicable diseases and disease spectrum and control. Aspects of public Health and Environmental Microbiology. Applied Microbiology; aspects of food and Industrial Microbiology. Diagnostic Microbiology. Vaccine production and immunization. Preservation of cultures and cultural methods. Pathogenic mechanisms of bacteria. Antibiotic assays and monitoring from body fluids and many others, anaerobiosis and methods. Phage typing; Research Methods and other techniques in Microbiology. Use of metabolic pathways in identification of bacteria, fluorescent antibody methods. Quality control and Instrumentation. Practical based on the above topics.

MLS 405: Laboratory Instrumentation & Techniques

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the principles instrumentation;
2. explain care of basic equipment;
3. describe the theory and practice of some common Analytical techniques; and
4. discuss automation used in Medical Laboratory Science.

Course Contents

Instrument aspects of qualitative and quantitative analysis – theory and practise of some common analytical techniques: colourimetry, spectrophotometry flame photometry, conductometry, polarography, and many others. Osmometry, Refractometry, Turbidimetry, pH Measurement by ion specific electrodes – Separation techniques including electrophoresis, - paper, cellulose acetate, Agar gel, starch and polyacrylamide gel, Isoelectric focusing, Isoelectric focusing, Chromatography – paper, Thin Layer Chromatography, Gas Liquid Chromatography, Ion exchange, gel filtration, molecular sieves; Dialysis filtration, solvent extraction, Centrifugation – Ultracentrifugation. Immuno-electrophoretic techniques, Radioimmunoassay, Competitive protein binding, Isotope dilution techniques, Enzyme Immuno Assays, Receptor Assays, Automation, Micro and Ultra micro Analysis. Practical based on the above topics. Theory and practice of some common Analytical techniques including tissue processing, Microscopy and other basic Microbiological Equipment, Principles and working of haematological Equipment, other applied techniques in the Medical Laboratory with emphasis on general Medical Laboratory Instrumentation. Practical exercises on the above topics.

MLS 406: Research Methodology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. conduct a research project;
2. discuss the role of research in health and social welfare; and
3. discuss the designing a questionnaire.

Course Contents

Introduction to research methodology. Collection of literature review articles Problem definition. Sampling technique Experimental designs of medical and public health studies. Questionnaire design and collection analysis. Interpretation and utilization of research findings. The role of research in health and social welfare. The need for Institutional and Governmental ethical clearance for some research projects. Research proposals and sourcing of funding for research projects. Art of scholarly publications and Instructional design.

MLS 408: Laboratory Posting II

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss the basic tests expected to conduct;
2. deliver accurate and reliable results of basic laboratory test;
3. recognise and practice as a team in the laboratory with the soul aim of producing cost effective results for the management of patient;
4. recognise and refer complex test to experience scientists; and 5. guide junior students.

Course Contents

Basic medical laboratory tests in Medical Microbiology/Parasitology including Virology, Mycology and Bacteriology, chemical pathology, Haematology and Blood Transfusion science and Histopathology. Such tests include detection of malaria parasites in blood and intestinal parasites in stool. Wet preparation and Gram staining of biological specimens. Preparation of media and inoculation of specimen. Determination of Hb, PCV and processing of blood samples for Haematology and blood Transfusion examinations. Screening of blood donors and Determination of ABO and Rhesus blood groups. Urinalysis, estimation of glucose, urea. Processing of Histopathology specimens including fixation, staining and cutting of tissues.

MLS 410: Clinical Chemistry I

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. acquire knowledge and skill required for the laboratory investigation of porphyriaemia; 2. describe the laboratory investigation of porphyria; and
3. discuss laboratory investigation of porphyrinuria.

Course Contents

Porphyrin, causes, symptoms and laboratory investigation of porphyriaemia, porphyria and Porphyrinuria, Haemoglobin, synthesis, function. Glycosylated haemoglobins. Abnormal haemoglobins and haemoglobinopathies, Liver function Tests.

Mechanism of Enzyme action and kinetics: Clinical Enzymology; Isoenzymes in medicine, Coenzymes and Vitamins. Definition, causes, consequences and investigation of some inborn errors of metabolism; Phenylketonuria, galactosaemia fructose intolerance, Albinism, aminoaciduria, Endocrine glands and functions; the hypothalamus, the pituitary, the parathyroid, adrenal cortex, adrenal medulla, the gonads and reproductive endocrinology. Foeto-placental function. Calcium and

bone metabolism. Pancreatic function tests. Basic neurochemistry, CSF – normal composition and changes in disease.

MLS 411: Blood Group Serology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss the components of ABO; and
2. acquire the knowledge of Rhesus blood group systems.

Course Contents

Blood groups – Other blood groups such as MNS, Duff, Kell, Kidd and many others. Grouping techniques and antibody screening, clinical significance, secretor status, antenatal Serology – screening and Titration. Compatibility procedures – different methods, advantages and disadvantages, Blood Transfusion reactions – causes and types; Investigation, Risks attendant in blood transfusion – Diseases, Anaphylactic, haemolytic and allergic reactions. Screening of Donor blood for disease agents such as HbAgs, HIV, VDRL. Practical/tutorials. Compatibility procedures – advantages and disadvantages. Practical based on the above topics.

MLS 412: Professional Ethics in Medical Laboratory Science

(2 Units C: LH 15;PH 45)

Learning Outcomes

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

1. discuss ethics in the practice of Medical Laboratory Science;
2. emphasise the significance of ethics of practice and confidentiality of results;
3. discuss the Ethical issues involved in private practice; and
4. describe the relationship between the Medial Laboratory Scientist and other members of the Health team.

Course Contents

Introduction to the Science and profession of Medical Laboratory Science. The different arms of medical Laboratory Sciences. Hall marks characterizing the lives of all professions; licensing to practice, Group culture patterns. Justice, rights and responsibilities as a professional.

The concept of duty, professional standards and Laboratory management. Authority and discipline. The use of reason. Personal relationships – inter and intra professional, Act of good faith. Place of religion in the hospital. Value judgment, exercise of professional judgment, skill and care charge and wellbeing of patients.

Patients - professional relationship – confidentiality, communication skills; trust; seeking to safe guard patients, particularly in respect to health and safety and information. Research training, professional development, knowledge and skill, quality control in the field of medical laboratory sciences and practice: Reputation. Fulfilment of professional role with integrity, refraining from its misuse to the detriment of patients, employers and colleagues. Medico-legal aspects.

BU-MLS 409: Introductory Medical Virology

(3 Units C: LH 30; PH 45)

Learning Outcomes

On completion of the course, students should be able to:

1. State ten (10) properties of viruses.
2. Recognise five (5) morphological features of viruses.
3. State five (5) criteria for the Baltimore classification of viruses.
4. Highlight seven (7) stages involved in the replication of a typical virus.
5. Identify five (5) pathologies observed in viral infection.
6. Explain two (2) major host's immune responses to viral infection.
7. Describe five (5) methods for the collection of clinical specimens for viral detection.
8. Describe five (5) laboratory techniques for viral detection in clinical specimens.
9. Name four (4) types of immunotherapeutic and chemotherapeutic agents used in the treatment of viral infections.
10. Categorise four (4) types of viral vaccines.

Course Contents

Definitions of important terms in medical virology. General properties and morphology of viruses. Nomenclature and classification of viruses. Life cycle of viruses. Reproduction and multiplication of viruses. Pathogenesis and pathology of viral infection. Host's immune response to viral infection. Viral transformation and mutation. Viral evasion of immune response. Collection of clinical specimens for viral culture. Methods of viral culture, isolation and purification. Laboratory diagnosis of viral infection. Rapid diagnostic test (RDT) kits. Enzyme linked-immunoabsorbent assay (ELISA). Haemagglutination test. Complement fixation test (CFT). Neutralization test (NT). Systematic study of viral diseases. Interferon. Immunotherapy. Chemotherapy in viral infection. Inclusion bodies. Cytopathic effects. Viral and host interactions. Viral vaccines and immunoprophylaxis.

BU-MLS 413: Immunology and Immunochemistry
45)

(3 Units C: LH 30; PH

Learning Outcomes

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

1. State three (3) principles behind the molecular basis of immune reactions.
2. Describe four (4) hypersensitivity states.
3. Explain the immunological basis of five (5) non-communicable diseases.
4. Describe the immune responses to five (5) infectious diseases.
5. Relate five (5) components of the complement system and associated abnormalities.
6. Describe four (4) immunoproliferative diseases.
7. Name four (4) tumour markers and methods of detection.
8. Identify four (4) interferences in immunoassay and describe the methods of detection.
9. Identify four (4) classes of immunotherapeutics and their mechanisms of action.

Course Contents

Molecular basis of immune reactions. Antigens and the immune response. Fate of antigens. Requirements for antigenicity. Immunoglobulin structure, function and classification. Phagocytic cells and phagocytosis. Chemotaxis. Opsonization. Functions of macrophages and granulocytes. Hypersensitivity states. The immunological basis of non-communicable diseases. Immunity to microbial infections. Immune cells. Immune organs. Immune system. Immune functions and regulation. The role of cytokines in immune responses. The complement system. Complement abnormalities. Immunology of tissues and organ transplantations. Immunoproliferative diseases. Tumour and tumour markers. Immunoassay and immunodiagnosics. Diagnostic immunological tests employed in various areas of specialization. Automation in immunoassay. Interferences in immunoassay and methods of detection. Quality assurance in immunodiagnosics. Applications of immunotherapeutics and immunotherapy. Immunomics.

BU-MLS 414: Exfoliative Cytology

(3 Units C: LH 30; PH 45)

Learning Outcomes

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

1. Define Exfoliative cytology
2. State five (5) features of urine cytology
3. Discuss five (5) features of normal cytology.
4. Outline five (5) features of abnormal cytology.
5. Explain with the aid of a diagram collection of a diagnostic specimen.
6. Outline ten (10) precautions to be taken by the patients before specimen collection.
7. Describe the collection of cerebrospinal fluid (CSF).

Course Contents

Cervical smear. Normal cytology. Bethesda system and non-neoplastic lesions. Normal histology. Cytology of female genital tract. Normal cells in cervical smear. Differential diagnosis. Endocervical cells. Organisms and infection. Cytological features of reparative and regenerative changes. Cervical carcinogenesis. Human papilloma virus. Effusion cytology. Urine cytology. Respiratory cytology. Gastrointestinal cytology. Cerebrospinal fluid cytology.

BU-MLS 415: Medical Law and Counseling Skills

(3 Units C: LH 45)

Learning Outcomes

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

1. Identify four (4) legal implications of MLS Practice.
2. State seven (7) rights in patient care and how to manage difficult patients without abusing their human rights.
3. Describe five (5) types of abuse encountered in healthcare.
4. State three (3) components of law of Private Practice in MLS.
5. Explain medico-legal aspects of torture, rape, abortion, drug abuse and suicide.
6. Discuss three (3) principles of counseling, care and support.
7. Highlight two (2) types of counseling and associated counseling skills.
8. Discuss five (5) crisis and conflict management skills.
9. Describe four (4) constraints usually encountered in counseling.
10. Recognize five (5) major drawbacks in genetic counseling.

Course Contents

History and philosophy of law. Types of law. Sources of medical law. Law of medical practice. MLS practice and legal implications. Human rights in patient care. Management of difficult patients. Ethical and legal issues in MLS. Torts in medical practice. Fraud and abuse in health care. Law of medical malpractice. Conviction for criminal offence. Business and legal aspects of health care. Consumer protection in MLS practice. Payment of health care providers. Retirement plans, structure and formation. Law of private practice in mls. End-of-life decision making and care. Medical definition and diagnosis of death. Euthanasia vs assisted suicide. Certification of death. Medico-legal aspects of psychiatry, torture, paediatrics, paternity dispute, assisted reproduction, organ transplantation, blood transfusion, rape, abortion etc. The legal perspective of biotechnology, genetic engineering, drug abuse, bioterrorism, environmental health pollution etc. Definition of counseling, care and support. Types of counselling. Crisis management. Problem solving. Decision making couple. Spiritual and pastoral. Who needs counseling. Constraints in counseling. Rewarding. Listening skills. Preventing and managing conflict. Genetic counseling.

Learning Outcomes

On completion of the course, students should be able to:

1. Differentiate between biosafety and biosecurity.
2. List at least seven (7) core requirements for biosafety.
3. Discuss the principles and application of maximum containment technologies with three (3) examples.
4. Explain three (3) techniques for hazard control and management.
5. Recognise five (5) components of the risk assessment tool.
6. State five (5) legal requirements of health and safety in Nigeria.
7. Highlight five (5) control measures for substances hazardous to health.

Course Contents

Concept and definition of laboratory hazards. Types of laboratory hazards. Risk assessment tool. Control and review. Core requirements for biosafety. Heightened control measures. Maximum containment measures for very high-risk operations. Incident recognition. Reporting. Bioethics. Transfer and transportation of infectious substances. Biosafety program management. Laboratory biosecurity. Containment principles. History of health and safety. Legal requirements of health and safety in Nigeria. First aid and emergency procedures. Cryogenic liquids and ionising radiation safety. Chemical health and safety. Control of substances hazardous to health (COSHH) regulations. Chemical classification, labelling and packaging (CCLP) regulation. Risk and the process of risk assessment. Health problems associated with using chemicals. Disposal requirements. Emergency procedures. Control measures. Personal protective equipment. Biological health and safety. Syringes and sharps. Working with bio-hazardous materials. Field-work health and safety in Nigeria. Field-work risk assessment. Other hazards. Risk assessment exercise.

Learning Outcomes

On completion of the course, students should be able to:

1. List five (5) types of parasites and hosts.
2. Describe the structure and life cycle of five (5) parasites of medical importance.

3. Explain the pathogenicity, mechanisms of disease induction and immunology of five (5) medically important protozoa and helminthes.
4. State five (5) control and preventive measures for the spread of medically important parasitic diseases.
5. Describe the morphology and life cycle of five (5) arthropods of medical importance.
6. Appraise five (5) strategies for the control of disease vectors and intermediate hosts of human parasites.
7. Discuss three (3) methods for the laboratory demonstration of parasites in clinical specimens.

Course contents

Parasitism and other animals associations. Types of parasites and hosts. Adaption to parasitic way of life. How parasite vacate their host. The ineffective agents of parasites. Sources, vehicles and portal of entry of parasitic infections. Basic knowledge of structure, classification and life cycle of parasites of medical importance. Pathogenicity, mechanisms of disease induction and immunology of medically important protozoa and helminthes. Epidemiology, control and prevention of medically important parasitic diseases. Methods of demonstration of parasites in clinical specimens. Vectors and intermediate host of parasites. Classes, morphology and life cycle of arthropods of medical importance. Life history and control of disease vector. Various diseases of importance transmissible by insects. Myiasis. Biology of mosquito in relation to transmission of malaria. Filariasis and viral infections. Strategies for control of disease vectors. Intermediate hosts of human parasites.

BU-MLS 420: Introductory Medical Mycology

(3 Units C: LH 30; PH 45)

Learning Outcomes

On completion of the course, students should be able to:

1. State five (5) general characteristics of fungi.
2. Highlight four (4) criteria for the classification of fungi.
3. List five (5) culture media needed for the selective isolation of fungi.
4. Appraise four (4) classes of fungal infections (mycoses).
5. Enumerate five clinical manifestations of fungal infection.
6. Mention five (5) clinical specimens required for laboratory diagnosis of fungal infection.
7. Describe two (2) methods required for the identification and demonstration of fungi in the laboratory.
8. State five (5) antifungal agents and their mechanisms of action.

Course Contents

Definitions of important terms in medical mycology. Basic concepts of fungal taxonomy and ecology. Morphology of fungi. Monomorphism and dimorphism. Groups and classification of fungi. Ecology of fungi. Diversity of fungi and fungus-like organisms. Relationship to other organisms. Types of lesion and mycoses. Characteristics and general features of fungi. Overview of fungal diseases. Description of the different etiological agents of fungal diseases. Superficial mycoses. Cutaneous mycoses. Subcutaneous mycoses. Systemic mycoses. Opportunistic mycoses. Epidemiology of mycoses. Major trends in invasive fungal diseases. Populations at risk and emerging factors. HIV-associated fungal infections. Predisposing factors. Collection, transportation and processing of fungal specimens. Identification and demonstration of fungi in the laboratory. Fungal physiology, nutrition, reproduction, growth and evolution. Preparation of culture media for fungal isolation. Inoculation, incubation, reading and interpretation of fungal culture media. Slide culture technique. Biochemical tests for identification of fungi. Potassium hydroxide preparation. Indian ink preparation. Germ tube test. Antifungal agents and usage, mode of action and drug resistance. Quality assurance in mycology laboratory. Safety in mycology laboratory. Impacts of fungi on humans. Fungi as food and medicine.

500 LEVEL

GENERAL COURSES:

MLS 502: Laboratory Posting III

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. show or demonstrate competency in independent running of a medical laboratory as a full fledged professional;
2. display right administrative acumen in the running of a medical laboratory facility; and
3. impart the right knowledge and professional know how to upcoming students and scientists.

Course Contents

Conduct of complex and intellectually tasking medical laboratory tests independently in the specific area of specialisation. Organisation and leadership in the administration of the laboratory. Coordination with other professionals that utilise laboratory services. Innovative technologies like molecular biology techniques e.g PCR, antigen/antibody serological assays among others.

MLS 503: Practical Exercises II

(2 Units C: PH 45)

Each student carries out practical based on the area of major specialty.

Clinical Chemistry

Determination of blood glucose, glucose tolerance test. Determination of calcium and phosphate, uric acid, cholesterol, creatinine clearance, electrolytes and urea, total protein albumin and globulin. Plasma protein electrophoresis. Determination of plasma enzymes: - aspartate transaminase, alanine transaminase, acid and alkaline phosphatase. Demonstration. Blood gases and pH by Astrup Technique. Paper and thin layer chromatography, Immunoelectrophoresis and agar gel immuno-diffusion techniques.

Demonstration: Radioimmunoassay of hormones in blood. Estimation of 17-oxo and Oxogenic steroids in urine. Estimation of urinary buffers. Calculation from first principle. Absorption and calibration curves. Colour Equivalence of artificial standards. Fractional test meal. Calculi analysis.

Haematology and Blood Group Serology

Investigations in paternity dispute. Investigation of haemorrhagic and preparation of cryoprecipitate, haemolytic disease of the new born (HDN), haemoglobinopathies, auto-immune haemolytic anaemia, enzymopathies. Preparation of anti-sera, bovine albumin, anti-human globulin. Gamma globulin neutralization test. Forensic application of Blood Group Serology.

Differential leucocytes count. Cytochemical procedures. Advanced techniques such as Demonstration of Iron, Foetal Haemoglobin, Ham's Test and many others.

Histopathology

Special staining methods – PAS, Manson trichrome, Iron Impregnation Methods. Cytological staining methods and collection of cytological samples. Chromosome analysis. Autoradiography. Museum techniques. Cyto-screening and slide reporting. Cutting sections using the microtomes. Tissue (cell) culturing, Fungi, amyloid, enzyme and other specialized demonstration methods.

Medical Microbiology and Parasitology

Examination, culture and identification of bacteria in CSF pleural, ascitic fluid. Blood culture, High vaginal swab, wound swabs, ear, eye, nasal and other swabs. Stool bacteriology. Sputum bacteriology, Urine bacteriology. Systemic fungal culture and identification. Semen analysis. Special serological tests. ASO, Widal, VDRL, rheumatoid factor, Complement fixation, neutralization, haemagglutination tests for identification of viruses. General identification of micro-organisms by animal inoculation. Biochemical tests for the identification of vibrio cholera, Shigella, Candida, Neisseria.

MLS 590: Research Project

(6 Units C: PH 270)

Learning Outcomes

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

1. explain laboratory procedures including safety precautions;
2. carry out independent researches that will lead to tangible outcomes; and
3. present outcome of their researches in seminars and conferences.

Course Contents

Independent research findings into selected areas/topics of interest to the supervising academic staff. Students will be required to carry out literature survey on the topics, perform experiments and produce reports (preferably at the end of second semester). Students will be subjected to both seminar and oral examination on the projects undertaken.

MLS 505: Seminar

(2 Units C: LH 30)

Learning Outcomes

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

1. identify a topic of current interest in any branch of medical laboratory science;
2. search for the appropriate literature in the chosen topic; and

3. prepare and disseminate the knowledge using the appropriate format within a time frame.

Course Contents

A seminar on current concepts or advances on a specific topic in medical Laboratory Science. The aim is to develop in the student the ability to search for past and current literature on any given topic.

MLS 508: Clinical Chemistry II

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe basic concepts of general principles of enzymes kinetics;
2. discuss analytical techniques employed in qualitative and quantitative determination of enzymes; and
3. describe basic concepts of activation.

Course Contents

Analytical Techniques. Birth of a new method, devising new techniques, biological trials and tests for acceptability. Solid/dry phase chemistry, dipstick technology, thin film technology. Immobilised enzymes. Analytical techniques employed in qualitative and quantitative determination of (a) Enzymes: phosphatases, transaminases, dehydrogenases, Kinases (b) Hormones: catecholamines and metabolites peptide and steroid hormones (c) Proteins: total proteins albumin and globulin, specific proteins (d) Lipids: cholesterol, triglycerides, glycerol, fatty acids and lipoproteins. (e) Trace elements – Fe, Cu Zn, Mg, Selenium (f) non-protein nitrogen – Urea, creatinine, creatine, uric acid, amino acids and ammonia Urinalysis; determination of urine specific gravity, osmolarity; qualitative tests for protein, glucose and reducing substances, Ketone bodies, bilirubin urobilinogen and blood. Haemoglobin and haemoglobin derivatives in urine. Spectroscopy of haemoglobin and its derivatives in blood and urine.

MLS 510: Medical Laboratory Haematology II (2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. conduct advanced haematological procedures;
2. discuss the disorders of Iron metabolism; and
3. describe the different automation in Haematology.

Course Contents

Anaemias, Disorders of Iron metabolism, vitamin B12 and Folate deficiencies, Haemochromatosis and related storage disorders; Radioisotopes in Haematology; Automation in Haematology,

Haemoglobinopathies. Cytochemical procedures, Lymphocyte Transformation Tests. Myelomatosis and order paraproteinemia. Test. Advanced Techniques.

MLS 512: Medical Laboratory Histopathology II

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. describe the basic concepts of the methodology of Histochemistry; and
2. describe basic concepts of the tissue culture technique.

Course Contents

Theory and Methodology of Histochemistry – Chromaffin tissues, Schmol's, Diazo and Perls and other histochemical techniques. Enzyme histochemistry: Acid and alkaline phosphatase, Oxidative enzymes. Genetic diseases. Karyotype abnormalities. Chromosome techniques. Tissue culture technique. Chromosome staining techniques Slide reporting.

MLS 514: Medical Laboratory Microbiology II

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. discuss basic concepts of methods for the diagnosis of fungal infections; and
2. discuss basic concepts of methods for the diagnosis of viral infections.

Course Contents

General characteristics of fungus diseases, types of mycoses and properties; opportunistic fungi Diagnosis and chemotherapy. Systemic mycoses (cryptococcosis, blastomycoses, histoplasmosis, coccidioidomycoses). Opportunistic mycoses (candidiasis, phycomycetes, aspergilloses and many others). subcutaneous mycoses. (such as maduro mycoses, sporotrichoses, chromoblastomycosis, and many others. Cutaneous mycoses – dermatophytosis. Superficial mycoses and many others. General properties, pathogenesis, diagnosis, epidemiology and control and recognition of fungi. Derma tropic and viscerotropic viruses. Smallpox, cowpox and vaccination; measles, rubella, chickenpox and shingles, Herpes viruses.

Yellow fever; Lassa fever, Hep A and B, Influenza, Arbor viruses. The neurotropic viruses (rabies, poliomyelitis, encephalitis, lymphocytic choriomeningitis virus, mumps viral transformation and types of tumours and viruses. Oncogene theory and many others. Viral gastroenteritis; Miscellaneous viruses.

BU-MLS 515 Medical Genetics and Bioinformatics (3 Units Core: LH 30; PH 45)

Learning Outcomes

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

1. Discuss four (4) genetic and environmental influences both on normal and on pathological behaviours.
2. Discuss four (4) current techniques used in molecular studies of human diseases.
3. Describe two (2) methods for nucleic acid extraction, detection, analysis, characterization and amplification.
4. State five (5) quality assurance and control measures required in a molecular diagnostics laboratory.
5. State three (3) applications of biotechnology and bioinformatics.
6. Enumerate five (5) benefits of biotechnology and bioinformatics to man.
7. Review information from two (2) genomic and proteomic databases.
8. List five (5) ethical, legal and social issues relevant to biotechnology and bioinformatics.

Course Contents

Chemical structures of genes. Human genome organization. Modes of inheritance. Genotype-phenotype relationships. Regulation of gene expression at all levels. Molecular evolution. Constructing the tree of life. Mutations and hereditary diseases. Monogenic and polygenic diseases. Common complex diseases. Genetic models of complex diseases and population genetics. Epigenetics and epigenomics. Population genetics. Protein modifications. Genetic and environmental influences both on normal and on pathological behaviours. Genetics of behavioural disorders. Prenatal and postnatal DNA based diagnosis. Introduction to forensic science. Invasive and non-invasive methods. Detection of fetal cells in maternal blood. Preimplantation diagnosis. Molecular genetic basis of diseases. Molecular diagnosis of pathologic genes. Current techniques used in molecular studies of human diseases. Applications of bioinformatics. Genetic engineering and recombinant methods. Production of biologicals. Biological analysis and automation. Production of monoclonal antibodies. Ethical issues in biotechnology. Genomics. Proteomics. Metabolomics. Genomic data and data banks. Genomic annotation. Analysis and designing of gene circuits. Data mining. Molecular anthropology and evolution. Protein and gene interaction network building. Molecular docking. Data structures and algorithms. Database management systems. Database storage systems. Structure of database. Ways to retrieve and feed information in database. Laboratory informatics. Chemoinformatics. Immuno-informatics. Statistical bioinformatics. Biological databases. Blast tool applications. Bioinformatics programming and software applications. Artificial intelligence. Biotechnology and bioinformatics in medical laboratory science.

BU- GST 500: Adventist Heritage Seminar Series**(3 Units C: LH 45)****Learning Outcomes**

On completion of the course, students should be able to:

1. Describe the four (4) dimensions/emphasis of Adventist education in relation to faith integration in teaching, learning, and life.
2. State at least seven (7) contributions of Ellen White to the Seventh-day Adventist Church
3. Assess five (5) benefits of Literature Ministry in relation to the Seventh-day Adventist Church mission
4. Analyze the meaning and implications of the Three Angels Messages
5. Assess Ellen G. White's counsels in relation any three (3) contemporary issues
6. Evaluate five (5) areas of Ellen White's counsels on Family life
7. Enumerate five (5) major contributions of Health Reforms, Health Institutions, and Medical Ministry to the growth of the Seventh-day Adventist Church
8. Develop at least two (2) community-based projects focused on service to humanity

Course Contents

Philosophy of Adventist Education. Harmonious Development. Biblical Foundation for Faith Integration. The Three Angels Messages. Spirit of Prophecy and Seventh-day Adventist Church. Ellen G. White's Conversion Story. E.G. White's Relationship with Jesus Christ. E.G. White's Writings and Contemporary Issues. Publishing Ministry. Family Life. Child Guidance. Health Ministry in Seventh-day Adventist Church. Health Reforms. Health Institutions. Healthy living. Alternative medicine. Medical Missionary. Health and Community Service. Dynamics of Community-based Projects. Benefits and Assessment of Community-based Projects.

BU- GST 540: Introduction to Digital Marketing**(1 Unit C: LH 15)****Learning Outcomes**

1. Be able to develop and execute a marketing plan. incorporating all elements of the marketing mix. segmentation and positioning strategies and other elements.
2. Have an understanding of the role of both digital and traditional media in marketing. and the intersection of online and offline strategies and tactics.
3. Be able to guide the development of a digital presence from a marketing point of view.
4. Be proficient in marketing analytics and quantitative evaluation of the marketing environment.
5. Have working knowledge of website design and development.
6. Familiarize oneself with the fundamentals of social media & digital marketing
7. Learn how to use existing social & digital marketing tools to achieve marketing and organizational objectives

8. Understand the concepts for creating engaging content & drive online campaigns
9. Create a framework to audit the current state of the digital assets
10. Be able to develop and execute a marketing plan. incorporating all elements of the

Course Contents

Digital Marketing Strategy: How the Internet works. understanding marketing strategy. the building blocks of marketing strategy. Crafting a digital marketing strategy.

Market Research: The importance of market research. Key concepts in market research. Online research methodologies. Justifying the cost of research.

Content Marketing Strategy: Defining Content marketing. Strategic building blocks. Content creation. Content channel distribution.

User Experience Design: Understanding UX design. Core principles of UX design. Mobile UX. Step-by-step guide to UX design.

Web Development and Design: Web development. Mobile development. Step-by-step guide to building a website.

Writing for Digital: Writing for your audience. Types of web copy. HTML for formatting. SEO copywriting. best practices for online copywriting.

Customer Relationship Management: A CRM model. understanding customers. CRM and data. the benefits of CRM. Social CRM. Step-by-step guide to implementing a CRM strategy.

Search Engine Optimization (SEO): Understanding SEO. Search engine friendly website structure. SEO and key phrases. Link popularity. User insights.

Search Advertising: Advertising in search. the elements of a search ad. targeting options. Bidding and ranking for search ads. Tracking. Planning and setting up a search advertising campaign.

Online Advertising: Online advertising objectives. the key differentiator. Types of display adverts. Payment models for display advertising. getting your ads online. Targeting and optimising. Tracking. Step-by-step guide to online advertising. The future of online advertising.

Affiliate Marketing. the building blocks of affiliate marketing. Setting up a campaign.

Video Marketing: Video content strategy. Video production step by step. Video promotion.

Social Media Channels: Social media channels. social networking. Content creation.

Bookmarking and aggregating. Location and social media. Tracking social media campaigns. social media marketing: Rules of engagement.

Social Media Strategy. using social media to solve business challenges. Step-by-step guide to creating a social media strategy. Documents and processes. dealing with opportunities and threats. Step-by-step guide for recovering from an online brand attack.

Email Marketing. Email strategy and planning

Mobile Marketing. the role of mobile in personal communication. Mobile messaging channels.

Mobile commerce. Integrating mobile into online marketing. Augmented reality. Mobile analytics.

MEDICAL MICROBIOLOGY & PARASITOLOGY OPTION

BU-MLS 513 Medical Parasitology and Epidemiology (2 Units C; LH 15; PH 30)

Learning Outcomes

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

1. Mention four (4) classifications of parasites of medical importance.
2. Describe the morphology, life cycle, pathogenicity, epidemiology and diagnosis of five (5) medically important cestodes and trematodes.
3. Describe the morphology, life cycle, pathogenicity, epidemiology and diagnosis of five (5) medically important intestinal and blood dwelling nematodes.
4. Explore five (5) diagnostic procedures for parasites in clinical specimens.
5. Explain three (3) mechanisms of disease induction by medically important parasites.
6. Discuss seven (7) control and preventive measures of parasitic diseases.
7. Discuss two (2) major immune responses to parasitic diseases.

Course Contents

Common terms in medical parasitology and epidemiology. Classification of parasites of medical importance. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of protozoans. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of cestodes. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of trematodes. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of intestinal nematodes with tissue stage. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of intestinal nematodes without tissue stage. Morphology, life cycle, pathogenicity, epidemiology and diagnosis of tissue and blood dwelling nematodes. Diagnostic procedures for parasites in clinical specimens. Definition and principles of epidemiology. Mechanisms of disease induction by medically important parasites. Epidemiology and control of parasitic diseases. Cell-mediated and antibody-mediated immune responses to parasitic diseases.

BU-MLS 517 Systemic Bacteriology (2 Units C: LH15; PH 30)

Learning Outcomes

On completion of the course, students should be able to:

1. Describe the morphology and cultural characteristics of five (5) medically important bacteria.
2. Explain the pathogenesis, virulence, general pathology, and host's defense response to five (5) medically important bacteria.
3. Highlight five (5) biochemical reactions and serological assays required for the identification and characterization of medically important bacteria.
4. Discuss five (5) treatment targets of medically important bacteria.

5. Review five (5) measures for the prevention and control of medically important bacteria.
6. Analyse clinical samples for the diagnosis of bacterial infections.

Course Contents

Morphology. Cultural characteristics. Biochemical reaction. Pathogenesis. Virulence. General pathology. Host's defense response. Epidemiology. Laboratory diagnosis. Antibiotic susceptibility test. Treatment targets. Prevention and control of medical important bacteria. Staphylococcus and streptococcus. Peptococcus and pneumococcus. Peptostreptococcus and micrococcus. Neisseria and moraxella. *Corynebacterium*. Diphtheria. Bacillus and clostridium. Non-sporing anaerobes. Proteus and shigella. Enterobacteriaceae. Salmonella. Pseudomonas and nosocomial infections. Yersinia pestis, francisella. Bordetella and brucella. Mycobacteria. Non-tuberculous mycobacteria. Spirochetes. Mycoplasma.. Actinomycetes and nocardia. Helicobacter, campylobacter, mobiluncus and chlamydia. Aerobic spore bearers. Laboratory diagnosis of syndromes. Upper respiratory tract infections (URTI). Eye infections, ear, nose and throat (ENT) infections. Lower respiratory tract infections (Lrti). Genital tract infections (GTI). Urinary tract infections (UTI). Gastrointestinal tract (git) infection. Wound infection. Central nervous system (CNS) infection. Vascular/systemic infection.

BU-MLS 519 Immunology of Infectious Diseases

(2 Units; Core; LH=15; PH=30)

Learning Outcomes

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

1. Highlight three (3) factors that determine susceptibility to infectious diseases.
2. Appraise four (4) mechanisms used by the immune system to detect and dispose of infectious agents.
3. Discuss five (5) mechanisms used by microorganisms to evade the immune system.
4. Describe seven (7) immunoassays used in the detection of immunological markers of infectious diseases.
5. Discuss three (3) relationships between Immunosuppression and infectious diseases.
6. List five (5) immunotherapeutics and their mechanisms of action.
7. List four (4) types of vaccine-preventable infectious diseases and associated vaccines.

Course contents

Role and activity of microbes as agents of infectious diseases. Pathogenesis, virulence, disease transmission and spread of infectious agents. Aspects of infection/host-parasite interaction. Factors that determine susceptibility to infectious diseases. Mechanisms involved in infection and pathology of diseases. Overview of the immune system. Basic principles of host immunity to infection against the diverse range of pathogens. Immune surveillance and responses to some

common infections. Mechanisms used by the immune system to detect and dispose of invasive agents. Phagocytosis. Cytokine and cytokine storm. Strategies to manipulate the immune system to prevent or treat infections. Mechanisms used by microorganisms to evade the immune system. Immunoassays. Detection of immunological markers of infectious diseases. Immunosuppression and immunosuppressants. Immunotherapeutics and immunotherapy. Vaccine and vaccinology. Assay of immune responses following vaccination.

BU-MLS 520 Currents Trends in Infectious Disease Diagnostics (2 Units C; LH 15; PH 30)

Learning Outcomes

On completion of the course, students should be able to:

1. Discuss the concepts, principles and procedures for five (5) current laboratory diagnostic tools used for the diagnosis of infectious diseases.
2. Enumerate three (3) advantages, limitations, and point-of-care adaptability of current laboratory diagnostic tools used for the diagnosis of infectious diseases.
3. Compare and contrast the diagnostic applicability of five (5) latest molecular approaches.
4. Describe two (2) predictive and prognostic tests for infectious diseases.
5. Describe the standard procedures for the collection of five (5) clinical specimens for diagnostic testing.
6. Highlight seven (7) challenges of infectious diseases diagnosis.

Course Contents

History and major landmarks in infectious disease diagnostics. Principles, advantages, limitations, and point-of-care adaptability of current laboratory diagnostic tools. Culture and culturomics. Metagenomics. Immunoassays. Non-nucleic acid-based identification tests. Nucleic acid-based tests. Polymerase chain reaction (PCR). Nucleic acid amplification test (NAAT). Oligonucleotide dna microarray. Ultrafast DNA sequencing. Array-based detection of nucleic acids. Lateral-flow immunochromatographic tests. Small panels. Multiplex molecular panels. Multi-pathogen testing. Point-of-care-testing (POC). Microfluidic. High-throughput omics technologies. Nanotechnology and single-molecule detection. Label-free detection methods. Nucleic acid probes. Biosensing. Surface plasmon resonance biosensors. Cantilever-based biosensors. Young interferometer. Mass spectrometry. Artificially intelligent nanopore. Home-based testing for infectious diseases. The role of nuclear medicine in the laboratory diagnosis of infectious diseases. Predictive and prognostic tests **for** infectious diseases. Quality and timeliness in diagnosis of infectious diseases. Collection of clinical samples for testing. Challenges of infectious diseases diagnosis in developing countries.

BU-MLS 523 Laboratory Techniques in Medical Microbiology (3 Units C: LH 30; PH 45)

Learning Outcomes

On completion of the course, students should be able to:

1. Describe the different three (3) steps required to ensure quality assurance of laboratory techniques.
2. Demonstrate sterilization using three (3) different methods.
3. List five (5) principles of sterilization in Medical Microbiology
4. Demonstrate four (4) staining techniques in Medical Microbiology.
5. Analyze five (5) clinical specimens.
6. Interpret semen analysis.
7. Discuss two (2) serological assays of microbial pathogens.
8. Describe and perform ten (10) biochemical tests required for the identification and characterization of microorganisms.
9. Practice three (3) procedures required for the laboratory diagnosis of fungal infections.
10. State five (5) essential features of record keeping in bacteriology laboratory.

Course Contents

Quality assurance measures in medical microbiology. Standard operating procedures. Methods for handling and processing of clinical specimens. Sterilization and disinfection. Assessment for the efficacy of disinfectants. Direct microscopy. Culturing techniques. Anaerobic and microaerophilic techniques. Phases of bacterial growth. Methods of total and viable counts estimation. Plate reading. Biochemical tests. Staining techniques. Procedures for examination of blood, sputum, and urine deposits. Procedures for examination of swabs of various sites. Semen analysis. Serological techniques. Examination of fungal specimens.

BU-MLS 525 Public Health and Pharmaceutical Microbiology (3 Units C: LH 30; PH 45)

Learning Outcomes

On completion of the course, students should be able to:

1. Define the term public health as it relates to microbiology and epidemiology.
2. Describe three (3) ways for the identification of bacterial, viral, parasitic, and fungal agents in the diagnostic laboratory.
3. Identify three (3) simple approaches to the rapid diagnosis of these infectious agents.
4. Describe four (4) functions of the public health practitioners and the link between Public Health and Microbiology.
5. Discuss five (5) classifications of antibiotics with two examples each.
6. Outline five (5) clinical considerations for antibiotic selection.
7. Identify five (5) dangers of indiscriminate use of antibiotics.

8. Experiment antibiotic susceptibility testing (AST) using three (3) different techniques.

Course Contents

Concept and significance of public health microbiology. Characteristics and identification of microorganisms and parasites. Infection and disease. Pathology. Normal microbiota. Nosocomial infections. Etiology of infectious diseases. Classification of infectious diseases. Epidemiology. Public health surveillance. Patterns of disease. Spread of infections. Contaminants in food and water sources. Samples collection for microbial and parasitic examination of water. Sewage treatment methods. Collection of samples for microbial and parasitic examination of water. Sewage treatment methods. Identification of microbial contaminants in food. Visits to water treatment sites. Discovery and history of antibiotics. Classification and modes of action of antibiotics and chemotherapeutics. Bacteriostatic and bactericidal agents. Antibiotic selection and their clinical considerations. Indications and contraindications of commonly used antibiotics. Antibiotic combination therapy. Manufacture and Quality assurance of pharmaceutical products. Preparation of antibiogram discs. Preparation and standardization of bacterial antigens and immune sera. Methods of antimicrobial susceptibility testing, determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). Determination of minimum fungicidal concentration (MFC). Assay of antimicrobial and antibiotics in body fluids. Microorganisms of pharmaceutical interest. Environmental monitoring and testing. Microbial detection systems. Use of animal models in the study of microbial infections and treatment. Mechanisms of antibiotic resistance.

CLINICAL CHEMISTRY OPTION

BU-MLS 515 Medical Genetics and Bioinformatics (3 Units Core: LH 30; PH 45)

Learning Outcomes

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

9. Discuss four (4) genetic and environmental influences both on normal and on pathological behaviours.
10. Discuss four (4) current techniques used in molecular studies of human diseases.
11. Describe two (2) methods for nucleic acid extraction, detection, analysis, characterization and amplification.
12. State five (5) quality assurance and control measures required in a molecular diagnostics laboratory.
13. State three (3) applications of biotechnology and bioinformatics.
14. Enumerate five (5) benefits of biotechnology and bioinformatics to man.
15. Review information from two (2) genomic and proteomic databases.
16. List five (5) ethical, legal and social issues relevant to biotechnology and bioinformatics.

Course Contents

Chemical structures of genes. Human genome organization. Modes of inheritance. Genotype-phenotype relationships. Regulation of gene expression at all levels. Molecular evolution. Constructing the tree of life. Mutations and hereditary diseases. Monogenic and polygenic diseases. Common complex diseases. Genetic models of complex diseases and population genetics. Epigenetics and epigenomics. Population genetics. Protein modifications. Genetic and environmental influences both on normal and on pathological behaviours. Genetics of behavioural disorders. Prenatal and postnatal DNA based diagnosis. Introduction to forensic science. Invasive and non-invasive methods. Detection of fetal cells in maternal blood. Preimplantation diagnosis. Molecular genetic basis of diseases. Molecular diagnosis of pathologic genes. Current techniques used in molecular studies of human diseases. Applications of bioinformatics. Genetic engineering and recombinant methods. Production of biologicals. Biological analysis and automation. Production of monoclonal antibodies. Ethical issues in biotechnology. Genomics. Proteomics. Metabolomics. Genomic data and data banks. Genomic annotation. Analysis and designing of gene circuits. Data mining. Molecular anthropology and evolution. Protein and gene interaction network building. Molecular docking. Data structures and algorithms. Database management systems. Database storage systems. Structure of database. Ways to retrieve and feed information in database. Laboratory informatics. Chemoinformatics. Immuno-informatics. Statistical bioinformatics. Biological databases. Blast tool applications. Bioinformatics programming and software applications. Artificial intelligence. Biotechnology and bioinformatics in medical laboratory science.

BU-MLS-529 Clinical Enzymology (2 Units Core: LH 15; PH 45)

Learning outcomes

On completion of this course, the student should be able to:

1. Define clinical enzymology.
2. Illustrate one (1) system of enzyme nomenclature.
3. Explain four (4) conditions which can give rise to low or high enzyme concentration.
4. Describe the procedures for four (4) enzyme assays.
5. Highlight five (5) safe measures for handling of enzyme and enzyme specimens.
6. Describe five (5) applications of clinical enzymology in biotechnology.

Course Contents

Definition of enzymes. Mechanics of enzyme action. Enzyme kinetics. Enzyme induction and inhibition. Enzyme purification. Enzyme specificity. Multiple forms of enzymes. Enzyme diagnostic values. Serum enzymes. Factors affecting serum enzyme activity. Serum enzymes in disease conditions. Importance of isoenzymes in biotechnology. Procedures for enzymatic assays. Safe handling of enzyme specimens. Clinically significant liver enzymes. Clinically significant cardiac enzymes. Clinically significant digestive enzymes. Quality management considerations in enzyme assay.

BU-MLS 530 Clinical Vitaminology

2 Units C: LH 15; PH 45)

Learning outcomes

On completion of this course, the student should be able to:

1. Explain one (1) relevance of biblical principles in human nutrition
2. Summarize one (1) concept of nutrition
3. Explain three (3) causes of malnutrition
4. Recall one (1) relevance of genomics in nutrition
5. Describe the history and four (4) biochemical functions of vitamins
6. Illustrate the physiological significance and deficiency state of vitamins

Course contents

Biblical principles in human nutrition. Concepts of nutrition. Types and importance of nutrition. Malnutrition. Nutrigenomics. Nutrition and metabolic disorders. History and biochemical functions of vitamins. Chemistry and metabolic functions of water and fat soluble vitamins. Physiological significance and deficiency state of vitamins. Vitamins in health and diseases. Assay methods for vitamins. Distribution, biochemical function and metabolism of micronutrients.

Hormonal control of micronutrients. Assay methods for micronutrients. Bone diseases. Investigation of bone disorders. Types and causes of bone disorders.

BU-MLS 531 Laboratory Techniques in Clinical Chemistry (3 Units C: LH 30; PH 45)

Learning outcomes

On the completion of this course, the student should be able to:

1. Describe five (5) basic analytical techniques in Clinical Chemistry.
2. Explain the solid phase chemistry, dipstick and thin film technology
3. Discuss five (5) analytical technique employed in qualitative and quantitative chemistry
4. Describe the procedure for urinalysis.
5. Outline five (5) advanced analytical techniques in clinical chemistry

Course Contents

Analytical techniques. Birth of a new method. Biological trials and conditions for acceptability. Solid/dry phase chemistry. Dipstick technology. Thin film technology. Immobilized enzymes. Analytical technique. Qualitative and quantitative determination of biological analytes. Urinalysis. Haemoglobin and its derivatives in urine and blood. Astrup techniques. Determination of blood glucose and other analytes in the blood. Determination of blood gases. Ph measurement. Astrup technique. Chromatography. Immunoelectrophoresis. Immunodiffusion. Radioimmunoassay. Enzyme immunoassay. Fluoroimmunoassay. Estimation of urinary buffer. Calculation from first principle. Absorption and calibration curve.

BU-MLS-551 Proteomics and Metabolomics (2 Units C: LH 15; PH 45)

Learning outcomes

On completion of this course, the student should be able to:

1. Explain the concept of proteomics and metabolomics
2. Describe three (3) methods of choice for solving biological and biomedical problems using the knowledge of proteomics and metabolomics.
3. Outline five (5) applications of proteomics and metabolomics in medicine and biology.
4. Identify three (3) major methods and approaches use to characterize protein structures and functions.
5. Identify five (5) factors that determine protein functions in the cell, as well as aspects such as protein dynamics, binding, and catalysis, to understand and develop molecules that impact larger biological functions.
6. Practice computational analysis of protein functions in order to characterize larger biological communities.

7. Apply four (4) metabolomics findings to address various biological, environmental and/or health related problems.

Course Contents

Biblical perspective on proteomics and metabolomics. Protein structure and function and their relationship to gene sequence. Proteomics in the lab. Measuring protein structures. Mass spectrometry. Spectral data interpretation and algorithms. Measuring protein dynamics. Protein binding and structural interactions. Enzyme catalysis. Next generation sequencing and other applicable techniques. Deep mutational scanning. Connecting protein functions to metabolism. Metabolic networks. Molecular ecology. Using microbial community data to infer community wide metabolic networks. Metatranscriptomics. Evolution of metabolic networks. Drug design and discovery.

BU-MLS-553 Clinical and Reproductive Endocrinology (2 Units C: LH 15; PH 45)

Learning outcomes

On completion of the course, students should be able to:

1. Describe the endocrine system and the mechanism of actions of hormones
2. State four (4) classes of hormones.
3. Explain three (3) mechanisms of hormone regulation.
4. Describe three (3) metabolic importance of selected hormones.
5. Identify four (4) tumours associated with hormones.
6. Test three (3) methods of analysis of various hormones

Course Contents

Biblical perspective to reproductive disorders. Endocrine glands-organization. Cellular communication by endocrine glands. Endocrine receptor binding control of endocrine action. Endocrine glands functions. The hypothalamus and pituitary. Endocrine glands functions. Thyroid gland. Endocrine glands functions. The parathyroid gland. Endocrine glands functions. Adrenal gland. Endocrine glands function. Pancreas. Reproductive endocrinology. Foeto-placental communication. Endocrine control of metabolism and endocrine disorders. Water balance. Thyroid hormone and reproduction. Investigation of hormone disorder. Dynamic test. Investigation of male and female infertility. Endocrine control of the menstrual cycle. Sexual differentiation.

BU-MLS-555 Biochemical Aspects of Nuclear Medicine (2 Units C; LH 15; PH 45)

Learning Outcomes

On completion of this course, the student should be able to:

1. Describe two (2) medical uses of nuclear technology.
2. Mention five (5) common sources of radiation.
3. List four (4) biological effects due to nuclear radiation.
4. Describe two (2) ways to estimate exposure for nuclear radiation using common dosage Units;.
5. Appraise five (5) applications of nuclear technology in diagnosis and treatment.

Course Contents

Basic nuclear physics. Nuclear binding energy. Radioactive decay. Nuclear fission. Nuclear fusion. Medical application and biological effects of nuclear radiations. Diagnostics. *In vitro* techniques. Methods of receptor assays. *In vivo* techniques. Study of organ systems. Thyroid. Bone. Liver. Gonads. Brain. Haematological studies. Infection and inflammation. Tumour imaging. Protein loss studies. Folic acids study. Schilling test. Therapeutic application of radio nuclides.

Learning Outcomes

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

1. Describe the science behind nutrition.
2. Discuss three (3) relationships between nutrition and metabolic disorders.
3. Identify five (5) types of metabolic disorders and their causes.
4. Distinguish between five (5) common types of nutritional and metabolic disorders.
5. Assess three (3) methods used for management of specific clinical nutritional metabolic disorders.
6. Screen one (1) person each for diabetes mellitus, iodine deficiency disorders, inborn errors of metabolism.
7. Identify five (5) causes of obesity and describe health consequences of obesity.

Course Contents

Carbohydrate Metabolism. Glucose Metabolism. Protein and Amino-Acid Metabolism. Lipids Absorption and Digestion. Lipids and Lipoproteins. Mineral Metabolism. Vitaminology. Inborn Errors of Carbohydrate Metabolism. Inborn Errors of Protein Metabolism. Antioxidant Defense System. Inborn Errors of Lipid Metabolism. Diabetes Mellitus. Hypertension and Coronary Artery Disease. Metabolic Syndrome. Obesity and Its Health Consequences. Polyphenols and Cardiovascular Disease. Iodine Deficiency Disorder. Celiac Disease.

HISTOPATHOLOGY/CYTOLOGY OPTION

BU-MLS 515 Medical Genetics and Bioinformatics (3 Units Core: LH 30; PH 45)

Learning Outcomes

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

17. Discuss four (4) genetic and environmental influences both on normal and on pathological behaviours.
18. Discuss four (4) current techniques used in molecular studies of human diseases.
19. Describe two (2) methods for nucleic acid extraction, detection, analysis, characterization and amplification.
20. State five (5) quality assurance and control measures required in a molecular diagnostics laboratory.
21. State three (3) applications of biotechnology and bioinformatics.
22. Enumerate five (5) benefits of biotechnology and bioinformatics to man.
23. Review information from two (2) genomic and proteomic databases.
24. List five (5) ethical, legal and social issues relevant to biotechnology and bioinformatics.

Course Contents

Chemical structures of genes. Human genome organization. Modes of inheritance. Genotype-phenotype relationships. Regulation of gene expression at all levels. Molecular evolution. Constructing the tree of life. Mutations and hereditary diseases. Monogenic and polygenic diseases. Common complex diseases. Genetic models of complex diseases and population genetics. Epigenetics and epigenomics. Population genetics. Protein modifications. Genetic and environmental influences both on normal and on pathological behaviours. Genetics of behavioural disorders. Prenatal and postnatal DNA based diagnosis. Introduction to forensic science. Invasive and non-invasive methods. Detection of fetal cells in maternal blood. Preimplantation diagnosis. Molecular genetic basis of diseases. Molecular diagnosis of pathologic genes. Current techniques used in molecular studies of human diseases. Applications of bioinformatics. Genetic engineering and recombinant methods. Production of biologicals. Biological analysis and automation. Production of monoclonal antibodies. Ethical issues in biotechnology. Genomics. Proteomics. Metabolomics. Genomic data and data banks. Genomic annotation. Analysis and designing of gene circuits. Data mining. Molecular anthropology and evolution. Protein and gene interaction network building. Molecular docking. Data structures and algorithms. Database management systems. Database storage systems. Structure of database. Ways to retrieve and feed information in database. Laboratory informatics. Chemoinformatics. Immuno-informatics. Statistical bioinformatics. Biological databases. Blast tool applications. Bioinformatics programming and software applications. Artificial intelligence. Biotechnology and bioinformatics in medical laboratory science.

BU-MLS 532 Diagnostic Cytology

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. State two (2) definitions of diagnostic cytology.
2. Enumerate five (5) features of cervical smear with their implications.
3. Write vividly on flow cytochemistry.
4. Calculate the karyopyknotic index (KPI).
5. Draw a well labelled diagram of female genital tract.
6. Explain two (2) diagnostic benefits of cerebrospinal fluid (CSF) cytology.
7. Discuss two (2) types of diagnostic cytology.
8. Enumerate five (5) procedures for collecting specimen in CSF cytology.

Course Contents

Cervical smear. Normal cytology. Special stain and immunocytochemistry. Histology and cytology of female genital tract. Normal cells in cervical smear. Differential diagnosis. Endocervical cells. Organisms and infection. Cervical carcinogenesis. Human papilloma virus. Cervical screening programme. Effusion cytology. Urine cytology. Respiratory cytology. Gastrointestinal cytology. Cerebrospinal fluid cytology. Hormonal examination. Flow cytochemistry.

BU-MLS 533 Immunohistochemistry

(2 Units C: LH 15; PH 45)

Learning Outcomes

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

1. Discuss two (2) epithelial tumour markers
2. Enumerate five (5) major breast tumour markers
3. Describe two (2) methods used for antigen retrieval.
4. Write on the term “Blocking” in immunohistochemical reaction.
5. Differentiate the two (2) major immunohistochemical methods.
6. Discuss three (3) hepatocellular tumour markers.

Course Contents

Immunohistochemical markers. Diagnosis of epithelial tumours. Immunoprofile of the upper respiratory tract. Heart and pericardial tumours. Tumours of the oral cavity. Salivary gland tumours. Thymic epithelial tumours. Tumours of the gastrointestinal tract. Gastrointestinal epithelial tumours. Gastrointestinal mesenchymal tumours. Exocrine and endocrine pancreatic tumours. Hepatobiliary tumours. Hepatocellular tumours. Breast tumours. Antibody panels for

breast carcinoma. Antibody panel for fibroepithelial tumours. Tumours of female reproductive organs. Renal and urinary tract tumours. Male genital tract tumours.

BU-MLS 535 Cytogenetics

(2 Units C: LH 30)

Learning outcomes

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

1. State three (3) types of chromosomal abnormalities.
2. Enumerate five (5) causes of abnormal chromosomes.
3. State five (5) effects of abnormal chromosomes in human.
4. Describe three (3) ways to handle and process DNA samples in the diagnostic laboratory.
5. State three (3) mechanisms for chromosomal translocation.
6. Discuss four (4) methods of sex-determination.
7. Write and explain the Hardy-Weinberg equation.
8. State five (5) clinical conditions appropriate for cytogenetic analysis.
9. Outline three (3) sources of specimens for chromosomal analysis.
10. Describe five (5) techniques for identifying abnormal gene and diagnosis of cytogenetic syndromes.

Course Contents

Sex chromosome. Inactivation of X-chromosome. Sex determination. Principles of clinical cytogenetic. Chromosomes in man. Normal karyotype, chromosome abnormalities. Klinefelter's and Turner's syndromes. Sex chromatin. Mapping of autosome and x chromosome. Dna synthesis. X-linked inheritance. Chimeras. Gene in families and populations. Selection and pedigree analysis. Mutation and mutagens. Hardy-Weinberg equation. Philadelphia and Christ Church chromosomes. Specimens for chromosome analysis. Chromosome banding and karyotyping. Chromosome abnormalities. Mutation and genetic diseases.

BU-MLS 536 Molecular Techniques and Forensic Science (2 Units Core: LH 15; PH 45)

Learning Outcomes

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

1. Write on molecular diagnosis in histopathology.
2. Define forensic science
3. Mention two (2) differences between Southern and Northern blot.
4. Describe Gel-electrophoresis as a method in molecular diagnosis.
5. Discuss with the aid of diagram, FISH as a molecular method.
6. Outline five (4) major steps involved in PCR.
7. Itemize five (5) differences between ELISA and FISH methods in molecular diagnosis.

8. Describe two (2) methods of fixation in forensic histopathology
9. Outline two (2) types of iatrogenic interventions

Course Contents

DNA analysis by fish. Molecular genomic analysis. Next-generation sequencing (NGS). Pre-analytic variables on tissue quality. Her2 testing. Quantitative histomorphometry. Quantitative polymerase chain reaction (PCR). Development of ihc-assays. Gel electrophoresis. Southern blot. Northern blot. Western blot. Enzyme linked immunosorbent assay (ELISA). Expression cloning. Macromolecule blotting and probing. DNA microarrays. Flow cytometry. Definition of forensic histopathology. Histopathology and drug abuse. Iatrogenic interventions. Histopathology of selected trauma. Hemorrhage. Skeletal muscle trauma. Neck trauma. Cardiac concussion. Cardiac contusion. Drowning. Injury by firearms. Stab wounds. Toxin and drug-abuse.

BU-MLS 538 Museum and Embalming Techniques

(2 Units C: LH 30; PH 45)

Learning Outcomes

On the completion of the course, the student should be able to:

1. Define a museum.
2. Outline five (5) importance of medical museum.
3. Summarize five (5) importance of embalming.
4. Describe two (2) major phases of embalming.
5. Discuss two (2) requirements for transportation of bodies.
6. Differentiate between arterial and trocar embalming methods.

Course Contents

Museum techniques. Importance of medical museum. Organization of medical museum. Special museum techniques. Types of preservation. Museum preparation. Major phases of embalming. Embalming techniques. Supplemental methods. Importance of embalming. Transportation of bodies. Exhumation. Embalming instruments. Embalming chemicals. Types of embalming. Injection techniques. Criteria for sites selection. Embalming steps.

BU-MLS 539 Tumour Immunology

(2 Units Core: LH 30)

Learning Outcomes

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

1. Define tumour immunology.
2. Outline five (5) characteristics of malignant cells.
3. Enumerate four (4) tumour markers specific to a named diseased condition.

4. Discuss three (3) methods used for tumour identification.
5. Explain tumour associated antigens and host response.
6. Distinguish between immunocytochemistry and immunohistochemistry.

Course Contents

Clinical oncology. Characteristics of malignant cells. Tumour associated antigens. Host response. Tumour makers in diagnosis. Tumour markers in disease management. Immunoassays. Immunocytochemistry. Immuno-scintigraphy. Immunotherapy. Breast tumour. Diagnostic antibody panel. Panel for fibroepithelial tumour. Antibody panel for mesenchymal tumour. Tumour of female reproductive organs. Renal and urinary tract tumours. Male genital tract tumour. Tumour of gastrointestinal tract. Gastrointestinal epithelial tumour. Gastrointestinal mesenchymal tumour.

BU-MLS 541 Systemic Pathology

(2 Units C: LH 30; PH 45)

Learning Outcomes

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

1. Outline five (5) organs specific to gastrointestinal system.
2. State at least four (4) functions of gastrointestinal tract.
3. Discuss three (3) roles of the heart as a major organ in cardiovascular system
4. Mention at least five (5) functions of the skin
5. Enumerate five (5) functions of lymphoreticular system
6. State four (4) functions of testes in male reproductive system
7. Discuss two (2) roles of nervous system
8. State at least three (3) function of a named organ in female reproductive system.

Course Contents

The cardiovascular system. Respiratory system. Lymphoreticular system. Bone marrow. Gastrointestinal system. The liver. Gallbladder and pancreas. Nervous system. The eye. Locomotor system. Kidneys and urinary tract. Female reproductive system. The breasts. Male reproductive system. Endocrine system. Excretory system. The skin. Infections.

HAEMATOLOGY AND BLOOD TRANSFUSION SCIENCE OPTION

BU-MLS 515 Medical Genetics and Bioinformatics (3 Units Core: LH 30; PH 45)

Learning Outcomes

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

25. Discuss four (4) genetic and environmental influences both on normal and on pathological behaviours.
26. Discuss four (4) current techniques used in molecular studies of human diseases.
27. Describe two (2) methods for nucleic acid extraction, detection, analysis, characterization and amplification.
28. State five (5) quality assurance and control measures required in a molecular diagnostics laboratory.
29. State three (3) applications of biotechnology and bioinformatics.
30. Enumerate five (5) benefits of biotechnology and bioinformatics to man.
31. Review information from two (2) genomic and proteomic databases.
32. List five (5) ethical, legal and social issues relevant to biotechnology and bioinformatics.

Course Contents

Chemical structures of genes. Human genome organization. Modes of inheritance. Genotype-phenotype relationships. Regulation of gene expression at all levels. Molecular evolution. Constructing the tree of life. Mutations and hereditary diseases. Monogenic and polygenic diseases. Common complex diseases. Genetic models of complex diseases and population genetics. Epigenetics and epigenomics. Population genetics. Protein modifications. Genetic and environmental influences both on normal and on pathological behaviours. Genetics of behavioural disorders. Prenatal and postnatal DNA based diagnosis. Introduction to forensic science. Invasive and non-invasive methods. Detection of fetal cells in maternal blood. Preimplantation diagnosis. Molecular genetic basis of diseases. Molecular diagnosis of pathologic genes. Current techniques used in molecular studies of human diseases. Applications of bioinformatics. Genetic engineering and recombinant methods. Production of biologicals. Biological analysis and automation. Production of monoclonal antibodies. Ethical issues in biotechnology. Genomics. Proteomics. Metabolomics. Genomic data and data banks. Genomic annotation. Analysis and designing of gene circuits. Data mining. Molecular anthropology and evolution. Protein and gene interaction network building. Molecular docking. Data structures and algorithms. Database management systems. Database storage systems. Structure of database. Ways to retrieve and feed information in database. Laboratory informatics. Chemoinformatics. Immuno-informatics. Statistical bioinformatics. Biological databases. Blast tool applications. Bioinformatics programming and software applications. Artificial intelligence. Biotechnology and bioinformatics in medical laboratory science.

BU-MLS 535 Cytogenetics

(2 Units C: LH 30)

Learning Outcomes

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

1. State three (3) types of chromosomal abnormalities.
2. Enumerate five (5) causes of abnormal chromosomes.
3. State five (5) effects of abnormal chromosomes in human.
4. Describe three (3) ways to handle and process DNA samples in the diagnostic laboratory.
5. State three (3) mechanisms for chromosomal translocation.
6. Discuss four (4) methods of sex-determination.
7. Write and explain the Hardy-Weinberg equation.
8. State five (5) clinical conditions appropriate for cytogenetic analysis.
9. Outline three (3) sources of specimens for chromosomal analysis.
10. Describe five (5) techniques for identifying abnormal gene and diagnosis of cytogenetic syndromes.

Course Contents

Sex chromosome. Inactivation of X-chromosome. Sex determination. Principles of clinical cytogenetic. Chromosomes in man. Normal karyotype, chromosome abnormalities. Klinefelter's and Turner's syndromes. Sex chromatin. Mapping of autosome and X chromosome. DNA synthesis. X-linked inheritance. Chimeras. Gene in families and populations. Selection and pedigree analysis. Mutation and mutagens. Hardy-Weinberg equation. Philadelphia and Christ Church chromosomes. Specimens for chromosome analysis. Chromosome banding and karyotyping. Chromosome abnormalities. Mutation and genetic diseases.

BU-MLSB 540 Immunohaematology

(2 Units C: LH 30; PH 45)

Learning Outcomes

Upon successful completion of this course, the students should be able to:

1. Appraise two (2) normal and two (2) abnormal blood banking tests
2. Relate five (5) unexpected test results with possible causes.
3. Provide a working knowledge of the principles and procedures of blood banking.
4. Describe the four (4) quality control measures in blood banking.
5. Describe the preparation and appropriate use of three (3) blood components.
6. Outline four (4) characteristics of the antigens and antibodies of the blood group systems.

Course Contents

Human leucocyte antigen system (HLA System). Platelet antigen/antibody. Biochemistry of major histocompatibility complex I (MHC-I). Detecting class I major histocompatibility. Extraction of lymphocytes. Mixed lymphocyte reaction test (MLR). Leucocyte antibodies. Identification of antibodies. Platelets antibodies. Blood components and its uses. Donor screening. Preparation of components. antigens/antibodies of the ABO, Rh and other blood group systems. Pre-transfusion testing procedures. Hemolytic disease of the newborn, neonatal and obstetrical transfusion practice. Autoimmune hemolytic anemia. Adverse effects of transfusion.

BU – MLS 543: Forensic Haematology (2 units Core; LH 30, PH 45)

Learning Outcomes

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

1. Explain the importance of haematological evidence in forensic investigations.
2. Describe the role of medical laboratory scientists in forensic haematology.
3. Apply Haematological Techniques to Forensic Science,
4. Demonstrate the ability to conduct blood typing and cross-matching in forensic settings.
5. Identify and interpret blood patterns, stains, and splatters.
6. Apply serological tests for the detection and identification of blood groups in forensic samples.
7. Understand Molecular Techniques in Forensic Haematology:
8. Discuss ethical considerations surrounding the use of forensic haematological evidence.

Course Content

Introduction to Forensic Haematology, Definition and scope of forensic haematology Overview of blood composition, function, and structure. Importance of blood in criminal investigations, Blood Group Systems in Forensics, ABO and Rh blood group systems: inheritance and forensic significance. Other blood group systems (e.g., Kell, Duffy, MNS) and their relevance to forensic science. Blood typing techniques and cross-matching. Identification of human vs. animal blood. DNA Analysis and Molecular Forensics. Principles of DNA extraction from blood samples. Polymerase Chain Reaction (PCR) and Short Tandem Repeat (STR) analysis. Blood Stain Pattern Analysis. Bloodstain patterns at crime scenes: splatter, drops, and pools. Collection, Preservation, and Handling of Forensic Blood Evidence. Best practices for the collection and storage of blood evidence. Legal, Ethical, and Professional Issues in Forensic Haematology.

BU-MLS 547 Paediatric Haematology

(2 Units Core: LH 30; PH 45)

Learning outcomes

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

1. Explain two (2) steps involve in blood production in children.
2. Enumerate five (5) sites where haematopoiesis takes place in the body.
3. Outline five (5) features of leukaemia in children and adult.
4. Discuss three (3) myeloproliferative disorders.
5. Describe three (3) staining techniques used for the investigation of myeloproliferative disorders.

Course Contents

Normal haematopoiesis. Normal coagulation. Molecular biology and genetic manipulation. Iron deficiency anaemia. Haemolytic anaemia. Malaria-associated anaemia. Haemolytic Disease of Newborn. Blood transfusion in children and neonates. Bone-marrow failure. Primary haemostatic defects. Secondary haemostatic defects. Thrombotic disorders. Acute Lymphoblastic Leukaemia. Acute Myeloid Leukaemia. Myelodysplastic disorders. Myeloproliferative disorders. Non-Hodgkin's lymphoma. Histiocyte disorders. Haematological changes in non-haematological disorders.

BU-MLS 549 Haemostasis

(2 Units Core: LH 30; PH 45)

Learning Outcomes

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

1. Identify five (5) component parts of blood vessels.
2. State five (5) haemostatic substances produced by the endothelium and the role of each substance in haemostasis.
3. Describe five (5) appropriate coagulation tests to aid in differentiating haemostatic disorders.
4. Discuss two (2) ways to interpret clinical and laboratory data to identify common coagulation disorders.
5. Enumerate five (5) maturational stages of the megakaryocytic cells line.
6. Outline three (3) steps in platelet kinetics.
7. List five (5) coagulation factors by Roman numerals and common names.
8. Explain two (2) ways how aspirin ingestion interferes with platelet function.

Course Contents

Definition of haemostasis. Platelet structure. Platelet physiology and function. Platelet function disorders. Platelet function assay. Abnormal haemostasis. Mechanism of haemostasis. Coagulation cascade. Process and substances influencing thrombosis. Fibrinolysis. Coagulation factors and associated disorders. Inhibitors and amplifiers. Modes of action and therapeutic use of anticoagulants. Control of anticoagulant therapy. Coagulation disorders. Bleeding disorders.

Laboratory investigations. Coagulation automation testing skills. Instrumentation in coagulation studies.

BU–MLS 545 Molecular Techniques in Haematology

(3 Units C: LH 30; PH 45).

Learning outcomes

On completion of the course, students should be able to:

1. Describe three (3) modern molecular diagnostic techniques.
2. Discuss the molecular basis of four (4) haematological disorders.
3. Describe two (2) molecular techniques that may be employed in the diagnosis of haematological disorders.
4. Explain two (2) procedures for collecting appropriate samples for the molecular diagnosis of haematological disorders.
5. Discuss two (2) procedures for processing samples for the molecular diagnosis of haematological disorders.
6. Explain the molecular methods for the diagnosis of five (5) haematological disorders.
7. Highlight five (5) steps required for troubleshooting in molecular diagnostic techniques.

Course Contents

Genetic and non-genetic haematological disorders. Molecular basis of haematological disorders. Genetic and epigenetic alterations. Histone modification. Haematological malignancies. Single nucleotide polymorphisms. Genetic engineering. Gene-transfer experiments. Manipulation of genes. Gene mapping. DNA/RNA extraction, isolation and sequencing. Recombinant DNA techniques. Southern Blot. Real Time Polymerase Chain Reaction (RT-PCR). Whole genome and exome sequencing. Cytogenetic techniques, fluorescence in situ hybridization (FISH) and comparative genomic hybridization. Karyotype analysis. Frameshift mutation. Genetic hybridization. New generation sequencing (NGS). Proteomics and pharmacogenomics in haematological diseases. Practical classes.

BU–MLS 546 Phlebotomy

(2 Units Core: LH 15; PH 45).

Learning Outcomes

On completion of the course, students should be able to:

1. Mention five (5) responsibilities of a phlebotomist.
2. Enumerate five (5) patient's rights in phlebotomy.
3. Mention three (3) criteria in selection of suitable sites for venepuncture.
4. Describe three (3) scenarios when not to take blood.
5. Describe five (5) sample-tube-types use in phlebotomy.
6. State five (5) standard operating procedures (SOP) in phlebotomy.
7. State five (5) indications and contraindications in phlebotomy.
8. Highlight five (5) appropriate actions required to prevent complications encounter in phlebotomy.
9. Highlight four (4) universal precautions during phlebotomy.
10. Discuss three (3) potential legal issues associated with phlebotomy.

Course Contents

Theory and practice of phlebotomy. Attributes of a phlebotomist. Patient's perspective of phlebotomy. Venepuncture. Order of draw and its importance. Specimen handling. Relevant policies. Sampling devices. Safety precautions. Potential complications associated with venepuncture. Restoring haemostasis of the puncture site. Instructions on post-puncture care. Universal precautions during phlebotomy. Legal issues in phlebotomy. Hazards associated with phlebotomy. Bloodborne pathogens. Post exposure prophylaxis to blood-borne pathogens. Special considerations in phlebotomy.