

MADONNA UNIVERSITY ELELE CAMPUS
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF MEDICAL LABORATORY
SCIENCE

REVISED ACADEMIC PROGRAMME
STUDENT HANDBOOK

2015/2016 SESSION

History

The Department of Medical Laboratory Science of the Faculty of Health Sciences College of Health Sciences Madonna University was established in 2000/2001 Academic Session with 21 students as its first intake under Assoc. Professor E.A. Nwokoro as the first Head of the Department. This was sequel to the approval from the University Senate and the National Universities Commission. The Department is located in the Elele Campus of the University. The pioneer students took their First Degree and Professional examination in 2005/2006 session when the Department received Provisional Approval from the Medical Laboratory Science Council of Nigeria (MLSCN) in the year 2005. Under the Acting Head of Department, Chief Sir I. I. Iroagba who handed over to Associate Professor I. N. Nnatuanya the current HOD, the Department has continued to witness tremendous yearly increase in student enrolments and in the yearly student turnover. Efforts are on going to bring about increase in facilities: structure and equipment and in quality of both academic and administrative staff.

Philosophy

The Philosophy of the Department of Medical Laboratory Science, College of Health Sciences, Madonna University takes its cue from the broad Philosophy of the College of Health Sciences in the country and that of the University. First the department is one with the College of Health Sciences and that of the University in the belief that optimal Medical Laboratory Science education can be achieved in an institution of higher learning that provides a foundation for general education in the various sciences.

To this end the department aims to provide sound scientific and professional basis for the production of Medical Laboratory Science personnel capable of working in any of the three levels of primary health services. The department would provide such training as would equip Medical Laboratory Scientists render Medical Laboratory services. It will, too, produce Scientists who would satisfy internationally recognizable standard and who would undertake further training towards specialization. Finally the department aims to produce Medical Laboratory Science personnel with sufficient management ability to play leadership role in health care delivery.

Objective

The objective of the department, therefore, is to prepare students for a career in Medical Laboratory Science. To this end the programme aims at providing the students with a broad sound and professional foundation for the practice of Medical Laboratory Science in any part of Nigeria or indeed the world. The Medical Laboratory Scientist is expected to:

- Perform effectively in clinical diagnostic services, research, and academic institutions and in quality assurance establishments.
- 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.
- Produce biological and diagnostic reagents/test kits as well as fabricate and maintain laboratory equipment.
- Develop and produce Medical Laboratory Scientists that will be able to address a range of transferable skills of value in medical and non-medical employment.
- Possess sufficient management ability to be able to play a leadership role in the training and practice of medical laboratory sciences.

The scope and the content of the programme is such that the Medical Laboratory graduates of this department should be competent to practise in private or public institutions or undertake post-graduate training in any local or foreign institutions. The training prepares them also to be on their own and thus become employers of labour.

Scope

The Department of Medical laboratory science offers a four year degree and professional programme for candidates admitted by direct entry and a five year programme for candidates admitted by entrance. Successful completion of the programme will lead to the award of Bachelor of Medical laboratory Science degree and registration with the Medical Laboratory Science Council of Nigeria. Courses in Medical Laboratory Science are offered under five disciplines: MLS Clinical Chemistry, MLS Haematology, MLS Histopathology, MLS Medical Microbiology, MLS Medical Parasitology/ Entomology and MLS Immunology/Immunochemistry. The programme is designed too to teach the students the central role laboratory investigation of components of biological fluids, blood, urine, cerebro-spinal fluid, secretions excretions, tissues or organs etc play in the diagnosis, management and prognosis of disease states. They are taught also to understand the workings of laboratory instruments and how to modify them where possible and preparation of reagents and test kits.

Admission Requirements

Candidates are admitted into the department of Medical Laboratory Science for Bachelor of Medical Laboratory Science degree and for the Professional examination either through the entrance mode for five year programme or by direct entry mode for four (4) year programme.

Unified Tertiary Matriculation Examination (UTME)

In addition to the University minimum entry requirements, the entrance candidates are required to have credit level passes in English Language, Physics, Chemistry, Biology and Mathematics in the West African School Certificate Examination or in the Senior Secondary School final examination or in the General certificate of education ordinary level examination. Credit level passes in the five papers in the National Certificate of Examination (NECO) are also acceptable. Credit level passes in any of the examinations shall not be in more than two sittings.

Direct Entry

In addition to satisfying the above requirements candidates for direct entry admission must hold the General certificate in Education Advanced level certificate or the Principal level passes Certificate in the Higher School Certificate Examination in Chemistry, Physics or Biology or Zoology. Holders of University degree from recognized universities or the Higher National Diploma Certificate in Biochemistry, Microbiology or in any other related courses can also apply for direct entry admission. Holders of Medical Laboratory Technician Certificate with relevant O level papers or the National diploma in Science Laboratory with relevant 'O' level papers may also be accepted for direct admission.

Job Opportunities

Successful students in the Bachelor of Medical Laboratory Science degree examination are equipped to take up careers as Medical Laboratory Scientists, in teaching and specialist hospitals, government hospitals, primary health care centres, research centres, private establishments water works or water treatment plants and in quality control units of industries etc. They can become employers of labour, by establishing their own diagnostic/research laboratories or instrument maintenance/fabrication centres. The training equips them for postgraduate studies in any university in Nigeria or in the World.

Regulations Governing the Degree and Professional Examinations

In addition to the Regulations Governing the Professional Examinations, we ensure that only students with the ability and inclination for the programme are presented for the Main Examination.

1. There is always in the department a prequalification or practice examination for students wishing to present themselves for the Main professional examination.
2. The prequalification or practice examination comprises courses taken in the relevant Main professional examination.

3. Only students who have achieved the same professional body's passing grades or scores in the courses in the prequalification or practice examination shall present themselves for the Main professional examination for the year.
4. Students who are unable to pass the prequalification or practice examination, after a first attempt, shall join those who failed the professional exam to resit it.
5. The first professional Examination takes place in the fourth year (400 level) and shall include all courses offered in the fourth year as provided in the departmental curriculum. The Medical Laboratory Science council of Nigeria (MLSCN) is involved in this examination as well as external examiners.
6. The candidate must also score 75% attendance at both lectures and practical classes in 4th year of study to qualify to sit for the examination. Failure to pass the examination, the student has a chance to resit. Failure to pass the resit examination will amount to repeating the whole year.
7. The final Professional/Degree Examination is taken in the 5th year of study (500 levels) and the courses taken are as in the academic curriculum. Both the Professional Regulatory Body (MLSCN) and External Examiners shall be involved in this examination.
8. On admission, each student is expected to register as a student member with the professional regulatory body. Medical Laboratory Science Council of Nigeria (MLSCN), as required by law (indexing).
9. On successful completion of the degree programme, the candidate becomes fully registered by the professional body only after induction by MLSCN and satisfactory completion of one-year mandatory internship in a recognized and accredited hospital/medical research laboratory centre.
10. After registration with the MLSCN the candidate is licensed to practice as a Medical Laboratory Scientist.

Course Coding System

Course code contains an abbreviation letter code of three letters representing the department offering the course and three digits. The first digit represents the year or level of study. The second digit indicates the subject or the stress area. The third digit denotes the semester. (Odd numbers represent first semester; even numbers represent second semester).

Departmental Code

Chemical Pathology	CPY
Haematology / BTS	HAE
Histopathology	PTH
Medical Microbiology	MMB
Immunology	IMM
Medical Lab. Science	MLS
Microbiology	MCB
Biochemistry	BCH
Physiology	PIO
Pharmacology	PCO
Mathematics	MTH
Physics	PHY
Chemistry	CHM
General Studies	GST
Computer Science	CSC
Anatomy	ANT
Parasitology/Medical Entomology	PME
Medical Virology	MVL

STRESS AREAS

General Courses for Medical Laboratory	-	0
Chemical Pathology	- - -	1
Medical Microbiology/Mycology	-	2
Haematology/Blood Transfusion Science	-	3
Histopathology/Cytology	-	4
Parasitology/Entomology	- - -	5
Immunology/Molecular Biology	-	6
Virology	- - -	7
Seminar	- - -	8
Project	- -	9

INSTRUCTION TO DIRECT ENTRY STUDENTS

Students who gained admission by direct entry into the 200 level will ensure that they register and pass the following General Studies Courses in addition to all the courses in the Faculty/Departmental curriculum, as applicable.

FIRST SEMESTER (FOR DIRECT ENTRY STUDENTS)

Course Code	Course Title	Unit
GST 111	Communication in English I	2
GST 113	Nigerian Peoples and Culture	2
GST 121	Use of Library, Study Skills and Information Technology	2
GST 123	Communication in French	2
GST 125	Introduction to Entrepreneurship Studies I	2

SECOND SEMESTER (FOR DIRECT ENTRY STUDENTS)

Course Code	Course Title	Unit
GST 104	Fundamental Philosophy	1
GST 112	Logic, Philosophy and Human Existence	2
GST 122	Communication in English II	2
GST 142	Communication in German	2
GST 162	Introduction to Social Science	2

COURSE OUTLINE
FIRST YEAR (100 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE		COURSE TITLE	UNIT
		Required Ancillary Courses	
CHM	101	General Chemistry I	3
CHM	171	General Practical Chemistry I	1
BIO	101	General Biology I	3
MTH	101	General Mathematics I	3
PHY	101	General Physics I	3
PHY	105	General Physics Laboratory I	1
		General Studies Courses	
GST	111	Communication in English I	2
GST	113	Nigerian Peoples & Culture	2
GST	121	Use of Library, Study Skills and Information Technology (ICT)	2
GST	123	Communication in French	2
GST	125	Introduction to Entrepreneurship Studies I	2
Total			24

SECOND SEMESTER

COURSE CODE		COURSE TITLE	UNIT
		Required Ancillary Courses	
CHM	102	General Chemistry II	3
CHM	122	Organic Chemistry I	1
CHM	172	General Chemistry Practical II	1
MTH	102	Elementary Maths II	3
PHY	102	General Physics II	3
PHY	106	General Physics Laboratory II	1
BIO	102	General Biology II	3
BIO	172	General Biology Practical	1
		General Studies Courses	
GST	102	Fundamental Philosophy	1
GST	112	Logic, Philosophy and Human Existence	2
GST	122	Communication in English II	2
GST	142	Communication in German	1
GST	162	Introduction to Social Sciences	2
Total			24

SECOND YEAR (200 LEVEL) COURSES**FIRST SEMESTER**

COURSE CODE	COURSE TITLE	UNIT
	Required Ancillary Courses	
ANT 221	Histology of Basic Tissues	2
ANT 215	Cross Anatomy I	3
ANT 271	Practical Histology	1
BCH 201	General Biochemistry I	3
PIO 201	Introductory Physiology and Hematology	3
CSC 104	Introduction to Computer Science	2
	General Studies Courses	
GST 211	Fundamental Theology	1
GST 215	Introduction to Entrepreneurship Studies II	2
Total		17

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
	Major Course	
MLS 204	Introduction To Medical Laboratory Science	3
	Required Ancillary Courses	
BCH 202	General Biochemistry II	3
ANT 216	Cross Anatomy II	3
PIO 262	Renal Physiology	2
	General Studies Courses	
GST 222	Peace and Conflict Resolutions	2
GST 224	Fundamental Ethics	1
GST 252	Bioethics	1
Total		15

THIRD YEAR (300 LEVEL) COURSES**FIRST SEMESTER**

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 301	Biomedical Engineering	3
MLS 303	Medical Laboratory Science Ethics	2
MLS 305	Medical Laboratory Science Instrumentation	3
MLS 345	Introduction to Medical Cytology	2
Required Ancillary Courses		
BCH 301	Special Topics in Biochemistry	3
PIO 311	Autonomic Nervous System/Endocrinology and Reproductive Physiology	3
PCO 311	Pharmacology & Toxicology I	3
PME 351	Basic Medical Parasitology/Entomology	3
Total		22

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 304	Laboratory Management & Organization	3
MLS 306	Laboratory Posting I / Practicals	3
MLS 308	Biostatistics	2
Required Ancillary Courses		
CSC 304	Computer Application	2
PCO 312	Pharmacology II	3
PTH 342	General Pathology	2
ANT 354	Introductory Histochemistry	2
IMM 362	Immunology I	2
BCH 362	Instrumental Method of Analysis In BCH	1
Total		20

FOURTH YEAR (400 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
MLS 401	Laboratory Posting/Practical II	2
CPY 411	Basic Chemical Pathology	3
MMB 421	Basic Bacteriology/Med Mycology	2
HAE 431	Basic Haematology / BGS	3
PTH 445	Basic Histopathology	3
IMM 467	Immunology / Immunochemistry	3
MVL 473	Virology I	2
Total		18

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
	Major Courses	
MLS 402	Laboratory Posting III / Practical	2
MLS 404	Counselling Skills	1
CPY 414	Chemical Pathology I	4
MMB 422	Medical Microbiology I	4
PME 456	Medical Parasitology/Entomology	2
HAE 436	Haematology I	4
PTH 444	Histopathology I	4
Total		21

HISTOPATHOLOGY/CYTOLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research Methodology on Pathology	2
MLS 505	Laboratory Posting / Practical	3
PTH 541	Histopathology II	2
PTH 543	Histopathology III	3
PTH 545	Exfoliative Cytology	2
PTH 547	Advanced Histopathology Techniques And Embalmmnt	3
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting	3
MLS 584	Seminar	2
MLS 592	Project	6
PTH 542	Cytogenetics	2
PTH 546	Museum Techniques	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

HAEMATOLOGY/BLOOD TRANSFUSION SCIENCE UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research methodology	2
MLS 505	Laboratory Posting	3
HAE 531	Haematology II	2
HAE 533	Blood Group Serology I	3
HAE 535	Blood Group Serology II	2
HAE 537	Advanced Haematological Techniques	3
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting/Practical	3
MLS 584	Seminar	2
MLS 592	Project	6
HAE 532	Cytogenetics	2
HAE 536	Advanced Blood Group Serology Techniques	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

MEDICAL MICROBIOLOGY/MYCOLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research Methodology	2
MLS 505	Laboratory Posting	3
MMB 521	Medical Microbiology II	2
MMB 525	Public Health Microbiology	2
MMB 529	Pharmaceutical Microbiology And Advanced Techniques	3
MMB 527	Medical Mycology	1
PME 551	Advanced Parasitology/ Epidemiology	2
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting	3
MLS 584	Seminar	2
MLS 592	Project	6
MVL 572	Medical Virology II	2
MMB 526	Microbial Genetics	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

CHEMICAL PATHOLOGY/TOXICOLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research Methodology	2
MLS 505	Laboratory Posting	3
CPY 511	Chemical Pathology II	2
CPY 513	Chemical Pathology III	3
CPY 515	Clinical Enzymology	2
CPY 517	Advanced Clinical Chemistry Techniques	3
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting	3
MLS 584	Seminar	2
MLS 592	Project	6
CPY 512	Clinical Endocrinology	2
CPY 514	Clinical Vitaminology/Toxicology	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

PARASITOLOGY/MEDICAL ENTOMOLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research Methodology	2
MLS 505	Laboratory Posting	3
MMB 521	Medical Microbiology	2
MMB 527	Medical Mycology	1
PME 551	Advanced Parasitology	2
PME 553	Medical Entomology I	2
PME 555	Parasitological Techniques	3
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting/Practicals	3
MLS 584	Seminar	2
MLS 592	Project	6
MMB 526	Microbial Genetics	2
MVL 572	Medical Virology II	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

MEDICAL VIROLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
	Major Courses	
MLS 503	Research Methodology	2
MLS 505	Laboratory Posting	3
MVL 571	Medical Virology	2
MVL 573	Clinical Virology	2
MVL 575	Diagnostic Virology	3
MVL 577	Epidemiology	3
<i>Total</i>		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
	Major Courses	
MLS 506	Laboratory Posting / Practicals	3
MLS 584	Seminar	3
MLS 592	Project	6
MVL 574	Diagnostic Virology	3
<i>Total</i>		15

N/B: 2nd Professional Examination for AMLSCN

IMMUNOLOGY/MOLECULAR BIOLOGY UNIT

FIFTH YEAR (500 LEVEL) COURSES

FIRST SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 503	Research Methodology	2
MLS 505	Laboratory Posting	3
IMM 561	Laboratory Methods For Detection Of Antigens And Antibodies	3
IMM 563	Molecular Cell-Biology And Biotechnology	2
IMM 565	Molecular Methods In Microbiology	2
IMM 567	Immunochemistry	3
Total		15

SECOND SEMESTER

COURSE CODE	COURSE TITLE	UNIT
Major Courses		
MLS 506	Laboratory Posting/Practicals	3
MLS 584	Seminar	2
MLS 592	Project	6
IMM 562	Clinical Immunology	2
IMM 564	Immunohaematology	2
Total		15

N/B: 2nd Professional Examination for AMLSCN

INSTRUCTION TO DIRECT ENTRY STUDENTS

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FIRST SEMESTER (FOR DIRECT ENTRY STUDENTS)

Course Code	Course Title	Units
GST 111	Communication in English I	2
GST 113	Nigerian Peoples and Culture	2
GST 121	Use of Library, Study Skills and Information Technology	2
GST 123	Communication in French	2
GST 125	Introduction to Entrepreneurship Studies I	2

SECOND SEMESTER (FOR DIRECT ENTRY STUDENTS)

Course Code	Course Title	Units
GST 104	Fundamental Philosophy	1
GST 112	Logic, Philosophy and Human Existence	2
GST 122	Communication in French	2
GST 142	Communication in German	2
GST 162	Introduction to Social Science	2

COURSE DESCRIPTION

BIO 111: General Biology I

(3 units)

Cell structures and organization, plant and animal cells, functions of cellular organelles, diversity and characteristics of living things. General reproduction, mitosis, meiosis, abnormalities associated with gene crossing, heredity and evolution.. Concept of ecology and types of habitats, diversity of plants and animals. Food chains and food webs, interrelationship of organism. Elementary biochemistry of carbohydrates, protein, lipids and nucleic acids.

BIO 122: General Biology II

(3 unit)

Ecology, ecosystems, biotic and a biotic factors, interrelationship between animals and plants, adaptation of plants and animals to their environments. Types of population dynamics, static, climax communities, types and factors affecting them. Edaphic factors, rainfall, wind relative humidity, light intensity etc. Modification of the natural ecosystem.

BIO 132: General Biology Practical

(1 unit)

Testing for the presence of food substances; diffusion and osmosis experiments; Observation of cells and tissues of selected plants and animal species; Investigations on physiological processes affecting photosynthesis; Observation of mitosis in onion bulb; Observation of cyst and ova of parasitic worms; Observation of fungi hyphae; Observation of bacteria cells; Preparation of microscopic slides; Basics of photometry; colorimetry, chromatography, electrophoresis.

CHM 101: General Chemistry I

(3 units)

Atomic structure and periodic table, Development of configuration of elements. Stoichiometry and mole concepts. Electronic theory of atoms and valence. Chemical bonding. Formulary and IUPAC basic nomenclature of compounds, Concept of matter, Laws of chemical combination by mass. Wave theory, principle of quantum mechanics. Periodictable and periodicity of fundamental properties. Hydrogen, Nuclear chemistry and Radioactivity and its application. General study groups to emphasize periodicity. Selected transition elements.

CHM 102: General Chemistry II

(2 units)

Structure of solid. Kinetic theory of gases and gas laws. Colligative properties of dilute solutions. Raout's law, Henry's law and Molecular weight determination. Thermo chemistry and Hess's law. Chemical Equilibrium. Law of mass action, reaction rate and chemical energetics. Electrochemistry. Ionic equilibria. Theory of acids bases and indicators. Catalysis. Ionics. Phase equilibrium, one and two component system. Enthalpy entropy and free energy.

CHM 171: General Practical Chemistry I**(1 unit)**

The theory and practice of simple volumetric and qualitative analysis e.g. Acid-base complexometric and redox titrations. Simple organic preparations, reaction of functional groups, laboratory safety and techniques in the laboratory

CHM 122: Organic Chemistry II**(2 units.)**

Historical survey of the development and importance of organic chemistry, IUPAC nomenclature and classification of organic compounds. Homologous series. Elemental analysis and molecular formula. Structural isomerism. Isolation and purification methods. The concepts of functional groups, resonance and aromaticity. Electronic theory in organic chemistry. A brief study of saturated and unsaturated hydrocarbons. Cyclohydrocarbons, alcohols, alkylhalides, esters, aldehydes and ketones, carboxylic acids, amines and aromatic compounds. Comparison of phenols, arylhalides and aromatic amines with their aliphatic analogs. Common synthetic polymers and their uses, introduction to oils and fats and stereo isomerism.

CHM 172: General Chemistry Practical II**(1 unit)**

Qualitative analysis of inorganic salts. Physical determination e.g. boiling point, melting point. Inorganic preparations and enthalpy change etc

MTH 111: Elementary Mathematics I**(3 units)**

- Real number system: Simple definition of integrals, rational and irrational numbers. The principle of mathematical induction; real sequences and series; elementary notion of convergence of geometry, arithmetic and other simple series; theory of quadratic equations
- Simple inequalities: absolute values and the triangle inequality
- Identities; partial fraction.
- Sets and subsets: Union, intersection, compliments, properties of some binary operations of sets: distributive, closure associative; commutative laws with examples. Relations in a set: Equivalence relation; Properties of set functions and inverse functions.
- Permutations and combinations; Binomial theorems of any index.
- Circular measures, trigonometric function of angles of any magnitude. Addition and factor formulae
- Complex numbers: Algebra of complex numbers. The Argand diagram, de Moivre's theorem N-Th root of unity

MTH 122: Elementary Mathematics II (3 units)

The course consists of geometric representation of vectors in 1 – 3 dimensions, components direction Cosines; Addition of scalar, multiplication of vectors; Linear independents; Scalar and vector products of two vectors; differential and integration of vectors.

PHY 111: General Physics I (3 units)

Mechanics, thermal physics and properties of matters:

1. Mechanics:

Scalars and vectors: Addition and resolution of vectors: Rectilinear motion and Newton's law of motion. Inertial mass and gravitational mass: free fall; projectile motion: deflecting forces and circular motion. Newton's law of gravitation; potential well; special case of circular motion. Momentum and the conservation of a momentum. Work, power energy for a gravitational field and elastic and elastic bodies.

2. Thermal Physics and Properties of Matters:

Temperature, heat, work, heat capacities; second law, Carnot cycle, thermodynamic ideal gas temperature scale. Thermal conductivity, radiation, black body and energy spectrum, Stefan's law. Kinetic model of gas: Equation of state, concept of diffusion means free path, molecular speeds. Avogadro's number, behaviour of real gases.

A model for a solid; Crystalline structure; Model for matter inter-particle forces in solids, liquids and gases.

PHY 151: Physics Practical I (1 unit)

This laboratory based course emphasis qualitative measurement. The treatment of measurement and graphical analysis. A variety of experimental techniques will be employed. The experiments include studies of matters; the Oscilloscope; mechanical systems; electrical and mechanical resonant system, light; heat; viscosity e.t.c. covered for all the Physics courses above.

PHY 122: General Physics II (3 units)

This course covers Electrostatics induction; Coulomb law; Gauss law. Electric field; electrostatic potential, capacitance; dielectric; electric current; circuits; analysis; alternating current; electromagnetic waves; particle duality; the Bohr theory of the hydrogen atom; nuclear properties, radioactive decay; nuclear fission and fusion; elementary particles theory.

PHY 152: General Physics Practical II (1 unit)

Practical Exercises for all the Physics courses above.

GST 111: Communication in English**(2 units)**

The basic objective of the course, use of English, is to prepare students to acquire certain language skills to succeed in their courses and in the society. The course teaches ability to read, comprehend, interpret, summarize materials from various registers and styles reflecting various disciplines or subject of study; ability to apply the knowledge of the structure, vocabulary, idioms oral forms and general patterns of the English language:

- Vocabulary Development: word Roots, Affixes, synonyms, Antonyms, Homonyms, Homophs and Homographs.
- Denotation and Connotation, Collocations, Idiomatic expression, Figures of Speech and Proverbs-Similes and Metaphors etc.
- Registers, Formal and informal Speech Patterns, Slang, Reference.
- Parts of Speech and Word Functions in Sentences.
- Paragraph Writing, Coherence and Unity,
- Punctuation and Capitalization, Spellings.
- Study Skills: Developing Effective Listening Technique Aids to Listening; What to Listen to; Listening for Instructions. Note Making Skills.
- Using the Dictionary. Pronunciation. Consonants, Vowels etc.

GST 122 Communication in English II**(2 units)**

- Introduction, speaking for academic purpose, objectives, the communication process, speech situations general guideline for effective speaking, organization, speaking at lectures, tutorials and seminars. Asking and answering questions.
- Reading comprehension: reading and the reader, actual reading activity; other reading comprehension skills.
- Continuous writing: the Essay, acquiring writing skills, types of Essay, approaches to Essay writing; sugGSTted topics for Essay writing.
- General repost writing introduction, definition, types of report, characteristics of reports, style, student research report, review of literature.
- Report writing in the sciences: introduction, overall language use, model report; result and discussion of results; conclusion.
- Business correspondence: Introduction, general principles in writing business letters, basic layout for business letter, parts of a business letter. Designing curriculum Vitae (CV) or Resume.

- The term paper definition choosing a topic, delimitations of a chosen topic. Collecting material for term paper, compiling a working Bibliography compiling a reference list. The APA style.

Each unit covers 2 weeks work.

GST 113: Nigerian Peoples and Culture (2 units)

This course will emphasize on the social issue of current significant and their impact on individuals/groups etc, concepts, sociological schools of thought, family formation processes, cultural practices and the health of the individual / community e.g. FGM, Child labour etc, Roles classifications.

GST 112: Logic, Philosophy and Human Existence (2 unit)

Etymological & predecessorial conception of philosophy, philosophy modes and methods, major branches of logic, logic & language, induction & deduction, fallacies, categorical proposition and categorical syllogism.

GST 121: Use of Library, Study Skills, And Information Technology (ICT) (2 units)

Brief history of libraries, library and education, University libraries and other types of libraries, study skills (reference services), types of library materials, using library resources including e-learning, e-ematerials etc, understanding library catalogues (card, OPAC, etc) and classification. Copyright and its implications, database, bibliographic citations and referencing.

GST 123: Communication in French (2 units)

1. French Alphabets
2. Pronunciation exercise on French vowels, consonants, diphthongs
3. General salutations in French
4. Greetings on special occasions: Bonne Année, Bonne chance etc.
5. Numeracy (Numbers)
6. Objects in the classroom using: C'est, voice voilà montrer, OÙ est?
7. Days of the week and months of the year.
8. Telling the time
9. Introduction of irregular verbs: **être**, verb "to be", **avoir**, verb "to have", **aller**, "verb to go"

GST 125: Introduction To Entrepreneurship Studies I (2 units)

The course provides both theoretical and practical approach to insight to Introduction to Entrepreneurship Studies. Theories, concepts and Practice, Forms of business, and New Ventures.

Business Plans – Designs and Implementation, factors influencing the location of small business, planning the business, organizing the business, directing the business and controlling the business. Students are expected to be familiar with feasibility study, project evaluation and cash flow analysis.

GST 142: Communication in German (1 unit)

Course Objective: Only a semester course; it is meant as an Introduction to German as a new foreign language for beginners. Through this course the student ought to be able to identify German optically in the written form and auditively in the spoken form from all other languages. He/she is to be equipped to speak and express him/herself in German in the commonest circumstances of everyday life. Thus he/she is to be acquainted with basic situations for a simple dialogue, but must also be familiar with basic syntax and grammatical rules for further progress in the given language, especially for apprehension and appreciation of simple literary texts.

GST 162: Introduction To Social Sciences (2 unit)

Origin, definitions, problems and relevance of social science; sub fields of social science: common concepts in social science; history, meaning, theories and consequences to mankind; leaders and leadership; definitions, typologies: self reliance and national development; development: meaning, indicators and scope; population growth and distribution in Nigeria, distribution of public goods through public agencies; personality: issues and theories; interpersonal relationship; meaning and factors of development; love and intimate relationship; moral regeneration in Nigeria: causes, problems and the way forward; war and peace: definition, theories, classification and control of war; agents of peace: The League of Nations, U.N.O, O.A.U, E.C.O.W.A.S etc; the Media and National Development.

GST 102: Fundamental Philosophy (1 unit)

The basic themes of Philosophy reflect the cultural predispositions for an ascent to truth, the essence of being. Existence and history. Thus an attempt at definition of philosophy, philosophy of the sciences, philosophy of value, theories of truth and general meneistics pave the way for and understanding of philosophy as systematic (system as well ordered whole; systemic as system theories about self organization in nature and science), which by all interest for the categorical (finite, temporal) realities, is open-ended for the absolute Differences. Thus Fundamental

Philosophy can only be possible with the backdrop of mendeisitics and hermenteutic; without mendeisitics a philosophical contention might remain elusive, without hermeneutic a syntactic exercise in futility.

MLS 204: Introduction To Medical Laboratory Science I (3 units.)

General Introduction to Medical Laboratory Sciences subjects namely: Clinical chemistry, Hematology and blood transfusions medical microbiology histopathology, and immunology. Specimen collection, reception and registration, storage disposal, specimen bottles, safety precautions in pathology laboratories against radiation hazards. Sterilization: Principles and techniques of chemical and physical methods. Glassware cleaning, care and maintenance. Handling of laboratory animals. Microscopy and Microtomy: Uses and care of microscopes, Refrigeration and freeze-dryers-principles, uses, care and maintenance. Handling of laboratory animals, Laboratory location and floor plan, Preparation of films and basic staining techniques. Safety precautions in the Medical Laboratory – Chemical Pathology, Medical Microbiology, Histopathology Hematology, General Precautions for Staff, Wash-up and disposal of specimen and culture. Safety measures in the design of Medical Laboratory, Animal house.

PIO 201 Introductory Physiology and Haematology (3 units)

Introduction to Physiology and its place in Medicine. The composite cell, cell membrane and transport mechanisms, membrane potentials. Physiology of excitable tissues. Biotechnology and Human Genome. General characteristics and functions of blood. Properties and functions of plasma. red blood cells; factors involved in erythropoiesis, blood groups. White blood cells; origin, type, properties functions, antigenicity and immunities. Platelets and hemostatic mechanisms. Reticulo- endothelial system. Clotting and fibrinolytic systems. Immunity and Immunodeficiency disease and HIV.

PIO 262: Renal Physiology (2units)

Fluid compartments of the body. Macroscopic, microscopic and ultra structure of the kidney. Functions of the kidney, Mechanism of thirst, Glomerular filtration, clearance, tubular reabsorption and secretion. Renal blood flow. Body fluids and electrolyte balance. Buffer mechanisms and pH regulation.

ANT 215: Gross Anatomy 1 (3 Units)

Upper Limb

Shoulder Bones and Joints, Muscles, Axils and Blood vessels, bronchial lymph nodes and mammary gland, **Arm:** Humeral and Elbow Joint, blood vessels, nerves, muscles. **Forearms:**

Bones, radio ulna joint, muscles, blood vessels and nerves. **Hand:** Bones, wrist and joints of the hand, muscles, blood vessels and nerves.

Lower Limb

Thigh – Femur and hip joint, lumbar and sacral plexuses, anterior compartment, muscles, blood vessels and nerves, femoral triangle; Medial compartment – muscles, blood vessels and nerves. Gluteal Region: muscles, blood vessels and nerves, Posterior compartment: Muscle, blood vessels and nerves, knee joint. **Leg:** Osteology of tibia and fibula, anterior- lateral compartment: Muscle, blood vessels and nerves. Posterior compartment: Muscle, blood vessels and nerves **Foot:** Ankle joint, other joints, Arches of the foot, Muscle, blood vessels and nerves

Thorax: Thoracic Skeleton: Bones and joints; Thoracic Muscles. Blood vessels. Nerves and Diaphragm; Thoracic age mechanic; Lungs and pleura **Mediastinum:** Superior and anterior; Middle (Heart and pericardium).

ANT 216: Gross Anatomy II

(3 units)

(Head and Neck, CNS)

Head and neck: Scalp and face, removal of the brain, cranial nerve, orbit, triangles of the neck- posterior, anterior, sub occipital, parotid region, intratemporal fossa, neurovascular bundles, nasal cavity, oral. Cavity, pharynx, lymphatic drainage. Osteology of bones of skull and cervical vertebrae: General Nervous Systems (GNS): Neuroanatomy: Brain stem, cerebellum and cerebrum, spinal cord including ascending descending pathways, motor cortex, cranial nerves. Pathways for hearing, smell and vision.

Abdomen: Anterior abdominal wall including muscles, blood, vessels and nerves. Abdominal incisions: Inguinal carnal and hernias, Peritoneum, stomach, small and large intestines, liver and biliary apparatus, pancreas and spleen, Kidneys and suprarenal glands, posterior abdominal wall.

Pelvic and Perineum: Osteology of the pelvis, pelvic diaphragm; anal region, unegenital region, external genitalia and female urinary bladder, Seminal vesicles and prostate, Female internal genitalia.

ANT 271: Practical Histology

(1 unit)

Practical classes on the topics covered.

ANT 221: Histology of Basic Tissues

(2 units)

1. Components of the cell, cell cycle, chromosomes, protein secretion and transcription of DNA.
2. Introduction to light microscopy, electron microscopy and units of measurement.
3. Basic tissues of the body, the epithelial, connective tissues, muscle and nervous tissue.

BCH 201: General Biochemistry I**(3 units)**

Historical perspectives of biochemistry; the living cell; organization and molecular architecture, types of cells and their characteristics. The structure, size and functions of organelles. Bimolecular and the origin of life. The structural units of macromolecules – structures and functions of amino acids, monosaccharide, glycerol, fatty acids and nitrogenous bases; inorganic synthesis of building units. Chemistry of amino acids, proteins and their derivatives. Measuring techniques in biochemistry – cell fractionation, chromatography (paper, thin layer, column, HPLC etc); calorimetry, spectrophotometry etc. Classification and hierarchical organization of proteins – primary, secondary, tertiary, and quaternary structures of proteins (with samples); determination and biochemical applications of the structures. The physical and chemical properties of water; acidity and alkalinity, pH, pOH. pKa, pKb values and their effect on cellular activities; buffer solutions – preparations of buffer solutions. The nature, classification and function of enzymes; introduction to enzyme kinetics.

BCH 202: General Biochemistry II**(3 units)**

Nutritional requirements and disorders, biochemical functions of trace elements. Liposoluble vitamins, hydro soluble vitamins; coenzyme structure and functions.

An outline of Biological oxidations leading to Intermediary metabolism of Carbohydrates, Lipids, Proteins, Amino acids, nucleic acids and nucleotides. Electron transport and Oxidative Phosphorylations, ATP and other High Energy Compounds and their importance. Inborn Errors of Metabolism to include Molecular basis of Metabolic diseases. Biochemical de-rrangement in G-6-PD deficiency, sickle cell anaemia, glycogen storage diseases, etc. illustrative laboratory exercises.

CSC 104 Introduction To Computer Science**(2 units)**

The meaning of computer; Origin; classification; Analog; Digital and Hybrid. Types of digital computer: mainframe, mini and microcomputer; Models of digital computers; modes of computer operations. The generation of computer types. The meaning of a programme and a “job”. The two levels of computer soft software: The high level and low level. The computer and the language level. The computer and the language levels. Examples of systems software: interpreters, compilers and transistors. The functions of system software. The function units of a digital computer. Example of application software: Lotus 1 -2 -3, Dbase 111 plus word star perfect etc. Data processing centers, criteria for using computer. Types of computer interfaces. The two main types of line printers. As example of non-impact printer, the laser printers, computer viruses: causes. Detection and preventive measures.

GST 211: Fundamental Theology (1 unit)

Fundamental Theology discusses the basic to Christian knowledge about God as public discourse, thus not in the form of a catechism of apologetics. Basic truths of Christian faith in open disposition to the world. This leads from Classical Apologetics through Vat II to Fundamental Theology, Classical Apologetics by the Fathers of the Church remained cases of *defensor fidei* that is to say, in confrontational language to other systems of meaning within history, to recalcitrant powers persecuting the Church etc. Fundamental Theology does not remain merely on the defensive or on the offensive in the face of the European Project of Enlightenment. Faith and reason need to understand each other, like in Anselm's earlier project of 'fides quaerens intellectus'.

GST 215: Introduction to Entrepreneurship Studies II (2 units)

The Course is a continuation of GES 125 Entrepreneurship Studies I. Here attention is given to Management of men (Personnel Management), Materials management and Purchasing, Money (financial) Management, Machinery (Technology) Management, Concept of Marketing, Market Segmentation, Product, Price, Promotion, Place, Salesmanship Personal Selling, Available Trade for Entrepreneurs and Decision Making.

Students are expected to be exposed to some of the Entrepreneurial Skills.

GST 221: Humanities I (2 units)

General Concept of Humanities including Greek influences on the Development of Classical Humanities. History of the development, the disciplines of the Humanities. African Humanities. Aspects of Culture and Civilization. Humanistic Definition of Culture. Language and Culture.

GST 222: Peace Studies and Conflict Resolution (2 units)

Basic concept in peace studies and conflict resolution, peace as vehicle of unity and development, conflict issues, types of conflicts e.g. ethnic/religious/political/economic conflicts, root causes of conflicts and violence in Africa, indigene/settler phenomenon, peace building, management of conflict and security. Elements of peace studies and conflict resolution, developing a culture of peace, peace mediation and peace-keeping, Alternative Dispute Resolution (ADR), Dialogue/arbitration in conflict resolution, role of international organizations in conflict resolution, e.g. ECOWAS, African Union, United Nations etc.

GST 224: Fundamental Ethics (1 unit)

- (i) The meaning of Ethics
The goal of Ethics; The modesty of human conduct
Ethics and related disciplines

- (ii) The subject matter of Ethics
The human act and the ‘act of man’
Enlightened Intellect
Deliberate will Freedom
- (iii) Responsibility of Human Act
Modifiers of the human act; Determinants of value
- (iv) The Goal of Human Life
Major ethical theories and the goal of human life
Utilitarianism
Pragmatism
Situationism
Existentialism
Etc.
- (v) Happiness of the good as the goal of human life
Characteristics of the good
- (vi) Road to Happiness:
Conscience
Truthfulness
Right and Duties
Natural virtues e.g. justice, temperance, fortitude, prudence and theological virtues,
particular virtue (patience), chastity (easy virtue) peace.

GST 252: Bioethics I (1 unit)

1. Meaning of Bioethics/its nature, history and scope.
2. Meaning of ethics-general or meta-ethics, kinds of ethics.
3. Some bioethical principles and ethical terms-respect for autonomy, non-maleficence/efficiency, human respect and dignity. Bioethics and bio-medical ethics.
4. Issues/trends of abortion/euthanasia, suicide/ etc.
5. Artificial insemination/reproduction and the “Elele Gift” scenario.
6. Human genetic modification/engineering, reproductive technologies/human cloning; human fertilization and sterilization.
7. Embryonic stem cell research and therapy.
8. HIV/AIDs, homosexuality/lesbianism and bioethics.

9. Bioethics and religious views (Catholic and Muslim).
10. Igbo/Edeh's concept of man and life and bioethical discourse; Drug experimentation on human beings and bioethical/bioethical/waste management.

GST 202: Humanities II (2 units)

Language and Human Communication: Concepts of Language and Communication in Human relations. Traditional and Modern Communication Techniques, their functions and constraints in mobilizing the citizenry for national development. Human Creativity: Identification of various forms of human expression. Philosophy. Concepts of Human right and social justice. Understanding History: African pre-colonial History, its attainment and Challenges. Cultural Nationalism and Political Evolution of African States. Concept of Religion in Humanistic Perspective. Traditional Education and its Humanistic functions. Role of Education in National Development. (Term Papers are also required to be submitted during the Second Semester).

MLS 303: Medical Laboratory Science Ethics (2 units)

History and philosophy of ethics in the practices of medical laboratory science. Relationship between religion and socio-cultural values on medical ethics. Ethical issues involved in private practice. Relationship between the medical laboratory scientist and his patient blood donor. Relationship between the medical laboratory scientist and other members of the health team. Intraprofessional auditing. Medical laboratory sciences ethics and consultancy services. Elements of informed. Consent in research. Relationship between proper dressing, personal comportment and patient care – the psychologist's view. Medical laboratory sciences ethics as it affects paternity disputes, infertility studies, sexually transmitted diseased, etc. Real case presentations, medico legal aspects of medical laboratory practice.

MLS 345: Introduction To Medical Cytology (2 units)

Collection, selection and preparation of cytology. (Specimen cervical smear, vaginal smear, bronchial aspirates ascetic fluids and other fluids). Cytology staining cells. Certification index, maturation index proGSTterone/androgen effect.

MLS 301: Biomedical Engineering (3 units)

Principle of applied and general electronics and the mechanics of electrical circuits. Fault finding, care and maintenance of common electrical equipment in laboratory use. Workshop practice, principles of use. Maintenance and repair of common apparatus and laboratory equipment. D.C currents and resistors, capacitors, potentiometers, and resistance boxes. Galvanometers and AVO meters. Solenoid, rheostat and transformers. Thermostats, semiconductors and rectifiers filters,

photomultiplier tubes and scintillators. Improvise techniques, improvement on existing equipment, review and modification of laboratory methods.

MLS 305: Medical Lab. Science Instrumentation (3 units)

Micrometry, designs and thermostatic controls of incubators, water baths and oven principles, care and use of the autoclave centrifuge, anaerobic incubators and jars, vacuum pumps, PH meters, membrane filtration equipment, chromatographic instruments, flame photometer, spectrum photometers, and colorimeters design and calibration. Principles of fluorescence, phosphorescence, luminescence and application. Nephelometry, Principles and applications of atomic absorption spectrum scope and atomic fluorescence. Continuous flow analysis and discrete analyzers. Scintillation and ionization counters-design, use and standardization. Principles and uses of electrophoresis pack, coulter counter and staining machines. Principles and uses of microtomes including cryostat and ultramicrotomes. Microtome knives, strops and hones. Automatic knives sharpeners.

Automatic tissue processing machines and timing discs. Paraffin section-mounting baths (water baths). Vacuum embedding phase contract and electron microscopes.

MLS 306: Laboratory Posting I (3 units)

Posting of students to all sections of job training under the supervision of qualified medical laboratory scientists. Close scoring of performance data cards. Evaluation. Scintillation and ionization counters–design use and standardization photo micrographic and autoradiographic equipment. Principles and uses of electrophoresis pack, coulter counter and staining machines. Principles and uses of microtomes including cryostat and ultramicrotomes. Microtome knives, strops and hones. Automatic knives sharpeners, Automatic tissue processing machines and timing discs. Paraffin section mounting baths (water baths). Vacuum embedding chambers. Fluorescent, phase contrast and electron microscopes.

MLS 304: Lab. Management and Organization (3 units)

Personnel and administrative management Medical Laboratory design, planning and organization. Laboratory management account and budgeting. Ordering, stock card indexing and storage. Occupational hazards and laboratory safety precautions. First aid in laboratory accidents.

PIO 311: Autonomic Nervous System/Endocrinology and Reproductive System (3 units)

Spinal cord–ascending, descending and motor cortex. Control of posture and movement. The reticular activating system, sleep, neural centers regulating visceral functions. Neurophysiological basis of instinctive behavior, conditioned reflexes, learning and temperature regulation. Sympathetic and

parasympathetic pathways. Role in the various systems especially cardiovascular, respiratory and gastrointestinal. Reproductive system, hormones etc.

BCH 362: Instrumental Methods Of Analysis In BCH (1 Unit)

Introduction to Biochemistry Laboratory: General information about Practical Biochemistry. Collection of specimen; laboratory instructions; Quantitative and qualitative assays in biochemistry. Safety in laboratory experiments. pH Dissociation and Buffers: Relevance of pH and Buffering; pH indicators and pH meter; Acid-base titration. General Tests of Carbohydrates, Lipids, Vitamins and Proteins. At Least three experiments to be conducted for each class of molecules. Quantitative Analysis of Urine: At Least four experiments to be conducted. Quantitative Analysis of Blood/Serum: At Least four experiments to be conducted. Enzyme Assays: Enzymes and Isoenzymes; Estimation of amylase in plasma; Urease activity and the effects of inhibitors. Effect of pH, T^0 , enzyme concentration, substrate concentration on the hydrolysis of Starch by Amylase. Demonstration of Some Techniques Used in Biochemistry: Detection, quantification and analysis of biomolecules by chromatography, Electrophoresis, Cell Fractionation and Centrifugation.

(Pre-requisite: BCH 201 & BCH 202)

BCH 301: Special Topics in Biochemistry (3 units)

Endocrinology: Structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones. Hormonal deficiency diseases and their deflection.

Methods of hormonal assay;

Linborn errors of metabolism: Molecular basis of G-6-pD metabolic diseases. Biochemical derangement in deficiency, sickle cell anemia, glycogen storage diseases etc. Xenobiotics and forensic biochemistry: Metabolism of foreign compounds. Induction of microsomal enzymes and drug resistance. Medico-legal-blood, urine and sweat test. Recent developments in forensic techniques. Neurochemistry: The neuron structure, composition and metabolism, neurohormonal regulatory and mechanisms. Metabolic antagonism in neurochemistry.

MCB 311: General Microbiology (3 units)

The kingdom protista organizational differences in eukaryotic cells. Classification and nomenclature of microorganisms. Bacterial cell form, structure, nutrition, reproduction and metabolism. Bacterial genetics. A typical prokaryotic cell-viruses Eucaryotic microorganism-fungi. Microbial control, microbes in food, water and environment. Bacterial infectious pathogenic microbiology. Laboratory animals, types of breeding and uses.

ANT 354: Introductory Histochemistry (2 units)

1. History of Histochemistry
2. Terminologies and Definitions
3. Principles and techniques of Histochemistry including Immunocytochemistry
4. The Microscope
5. Fixation, tissue processing
6. Enzyme Histochemistry

IMM 362: Immunology I (2 units)

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

CSC 304: Basics of Information Technology and Bioinformatics (2 units)

The lectures will focus on the basic knowledge required in this field, methods of high-throughput data generation, genetic sequence comparison & alignment, accessing public genome-related information and data, and tools for data mining and analysis. Details of Information Technology as related to Medicine, Internet, Web generations, networking, hardware, software, digital media, information systems in the business world, databases, fundamental theories and practices of Bioinformatics and Programming; Practical appreciations and applications.

PCO 311: Pharmacology And Toxicology I (3 unit)

Scope of pharmacology, origin and sources of drugs, routes of administration of drugs. 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, adverse drug reactions. Drug dependence and drug interaction.

PCO 312: Pharmacology And Toxicology II (3 units)

Antimicrobial pharmacology, chemotherapeutic agents, anti tabolite base analogues, mitotic inhibitors, base analogues, mitotic inhibioties, enzymes, alkylating agents and hormones. Radiation therapy, immunatherapy and cancer therapy. Synthesis and physiology of neurotransmitters. Biochemical basis of depression, narcotics mechanism of action. Fluorescent radio and chromatographic methods in drug studies. Methods in drug studies. Methods of evaluation of toxins mutagens and carcinogens.

STA 308: Biostatistics (3 units.)

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

PTH 342: General Pathology (2 units)

Introduction-ancient, traditional and modern concept of diseases and their causes. The normal cell and cellular basis of disease. Tissues and cellular injury, Reaction to cellular inflammation, Necrosis, healing and repair. Disturbances and genetic disorders, pigmentary disturbances. Calcification and amyloidosis. Disorders of nutrition.

PME 351: Basic Parasitology/Medical Entomology (3 units)

Classification and life cycle of protozoan– the amoebas, ciliates, flagellates and sporozoans. Life cycle and pathogenicity of the nematodes ascaris, strongyloides, Trichuris guinea worm, hookworms, trichinelia, Enterobius etc. life cycle and pathogenicity of cestodes. Life cycle and pathogenicity of the trematods schistosomes, fasciola, paragonismus etc. methods of demonstration of parasites in blood, faeces vagina, urine, urethra, pus from lungs and liver, skin snip etc. mechanisms of their diseases production. Epidemiology and control of parasitic diseases. Arthropods of medical importance the crustaceans, arachnidan, hexapoda, myasis etc, their biology life cycles and control.

MLS 401: Laboratory Posting/Practical II (2 units)

MLS 402: Laboratory Posting III/ Practical (2 units)

Intensive posting to all sections of clinical laboratories for on the job training under the supervision of qualified Medical Laboratory Scientist. Close scoring of performance data cards evaluation.

MLS 404: Counseling Skills**(1 units)**

Definition of Counseling, care and Support, Types of Counseling pre test, Post test, preventive 1 or 2, crisis, problem solving, decision making couple, spiritual and pastoral; who needs counseling, prospects/benefits of counseling, constraints in Counseling, rewarding listening skills preventing and managing conflicts; Genetic counseling including sickle cell trait in marriage etc. case studies; the way forward.

CPY 411: Basic Chemical Pathology**(3 units)**

Normal contents of body compartments and their measurements sodium, potassium, calcium, magnesium, glucose, plasma and bonates. Estimation of blood and urine glucose, plasma and serum proteins, water balance, sodium and chloride balance. Clinical disorders of water depletion, water excess, sodium excess, recognition of combined sodium and water depletion. Treatment of water and electrolyte imbalance in infants. Potassium-normal values, hyperkalaemia. Magnesium, cation exchange resin therapy, maintenance of normal blood pH.

Metabolic disturbances of acid-base balance. Metabolic acidosis, respiratory acidosis. Metabolic and respiratory alkalosis, investigation of disturbances of acid base equilibrium. Blood chemistry in bone disease. Disorders of bone formation osteoporosis, osteomalacia, hyperparathyroidism. Biochemical analysis of faeces.

CPY 414: Chemical Pathology I**(4 units)**

Principles of analytical techniques in clinical chemistry devising new techniques, biological traits and tests for acceptability. Solid / Dry phase chemistry, dipstick technology, thin film technology immobilized enzymes analytical techniques for qualitative and quantitative determination of enzymes, hormones, proteins, lipids, trace elements, non-protein nitrogen, volumetric analysis-partition, absorption, gel filtrations, iron exchange and gas liquid chromatography. Electrochemical analysis principles of potentiometric analysis. Fractionation of proteins fractional precipitation (salting out), chromatographic and electrophoretic procedures. Protein precipitants mode of action and choice in analytical procedures.

MMB 422: Medical Microbiology I**(4 units)**

Principles of bacterial taxonomy, biochemical and serological basis of identification of bacteria of medical importance. The phylogenic cocci (Staph, Strept, Pneumocci, Neisseriae). The enterobacteriaceae-coliforms, gastro-enteritis and food poisoning, salmonella, shigellosis, vibrio cholera, pseudomonas, bacteriodes etc. the haemophilic bacilli (haemophilus, Brucellae, Yersinia, Bordetella etc). Anaerobic spore formers-Aerobic spore formers. (Bacillus anthracis, Clostridia). The Spirochaetes, the Mycobacteria, Actinomycetes, Corynebacteriae, Rickettsiae, Chlamydae,

Mycoplasma, L-Forms, Listeria, Erysipelothrix, Bartonella etc. General pathology, epidemiology features, diagnosis, control and therapy. Aseptic collection of clinical specimens. Supportive investigations-skin tests etc to aid diagnosis. Rapid techniques in medical microbiology.

PME 456: Basic Medical Parasitology/Medical Entomology (2units)

Classification and life cycle of protozoan– the amoebas, ciliates, flagellates and sporozoans. Life cycle and pathogenicity of the nematodes ascaris, strongyloides, Trichuris guinea worm, hookworms, trichinella, Enterobius etc. life cycle and pathogenicity of cestodes. Life cycle and pathogenicity of the trematodes schistosomes, fasciola, paragonimus etc. methods of demonstration of parasites in blood, faeces vagina, urine, urethra, pus from lungs and liver, skin snip etc. mechanisms of their diseases production. Epidemiology and control of parasitic diseases. Arthropods of medical importance the crustaceans, arachnidan, hexapoda, myiasis etc, their biology life cycles and control.

MVL 473: Virology I (2 units)

Morphology and life cycle of viruses. Nomenclature and classification various methods. Reproduction, resistance, pathology, collection of clinical specimens for viral culture. Culture methods for isolation viruses, purification, immunity and laboratory diagnosis of viral infections haemagglutination test, CFT, neutralization tests. Systematic study of viral diseases. Interferon, immunotherapy and chemotherapy in viral infections, inclusion bodies and cytopathic effects. Viral/Host interactions and identifications. Viral vaccines and immunoprophylaxis.

MMB 421: Basic Bacteriology/Medical Mycology (3 units)

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

HAE 431: Basic Haematology/BGS (3 units)

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

principles and mode of action of common anticoagulant's simple tests used in blood coagulation investigations. Haemochromatosis and related storage disorders.

ABO and rhesus blood groups inheritance, biosynthesis, distribution and genetic theory. Blood grouping techniques principles, advantages, and disadvantages. Antisera, lectins and enzymes including preparation and standardization.

Anticoagulants used in BCS ACD, CPD – A, etc. modes of action and side effects. MRC blood bottles and plastic bags advantages and disadvantages. Blood donor screening, preparation and blood and products-cryoprecipitate, platelet rich plasma, packed cells, fresh frozen plasma, fibrinogen, WBC etc. blood compatibility testing. Investigation of transfusion reactions. Blood group specific substances neutralization reactions. Blood banking organization, structures, facilities and records. Quality assurance physical chemical and reagent AHG DCT and ICT procedures.

HAE 436: Haematology I (4 units)

Haemoglobinopathy I & II to include red cell membrane haemoglobin, and enzyme abnormalities. Hereditary defects of **RBC** metabolism. Acquired haemolytic anaemias and their investigation. Leucocytes, Physiology, Kinetics and function. Leucocytosis and leucopenia, Leukaemias classifications including the FAB mode, features and Laboratory management. Cytochemical procedures, Myeloproliferative and lymphoproliferative disorders. Preparation and cytology of blood and bone marrow films in health and disease. Platelets Structure, Physiology and functions. Tests for platelets, vascular integrity, inhibitors fibrinolytic activity etc. haemorrhagic disorders. Control of anticoagulant therapy, haemophilia states.

PTH 444: Histopathology 1 (4 units)

Principles of Histochemical methods. DNA demonstration by Feulgen techniques, silver impregnation methods. PAS, Masson trichrome. Iron impregnation methods, Cyto-screening and slide reporting. Tissue culture techniques, Genes and genetic codes. Chromaffin tissues, Schmorl's, Diazo and Parli's reaction. Other histochemical procedures. Enzyme histochemistry Acid and Alkaline phosphatases, Oxidative, Enzymes, Quality assurance and automation in Histopathology Laboratory.

PTH 445: Basic Histopathology / Histochemistry (3 units)

Fixation, autolysis, bacterial decomposition, effects of fixation, common fixing agents and their uses. Secondary fixation pigments, decalcification aims and application, decalcifying agents, tests for checking completion of decalcification. Dehydration, clearing and infiltration/embedding. Frozen and celloidin sections, embedding media. Basic histology of organs. Tissue sectioning procedures and slide preparation. Staining procedures. Storage of blocks, museum techniques

colour restoration, mounting in museum jars, gross appearance of diseased organs in routine post mortem. Slide examination to illustrate normal and abnormal features common tumours etc.

IMM 467: Immunology/Immunochemistry (3 units)

Cell mediated immunological reactions. Hypersensitivity reactions, immunological tolerance, autoimmunity and autoimmune diseases. Immunosuppression and immunodeficiency diseases. Immunity and infections. Tumour immunology. Immune reactions in tissue damage. Immune complex diseases. Diagnostic tests of assessing cellular immune functions. Principles of fractionation procedures. Vaccination and immunization.

CHEMICAL PATHOLOGY/TOXICOLOGY UNIT

MLS 592: Project (6 units)

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

MLS 503: Research Methodology (2 units)

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

CPY 511: Chemical Pathology II (2 units)

Physiology of the pancreas and the alimentary canal. Pancreatic function tests to include secretion and pancreozymin stimulation tests. Glucose tolerance test, insulin sensitivity test, estimation of amylase. Estimation of the activity of trypsin in duodenal contents, gastric function tests to include HCL secretions, histamine and augmented histamine tests. Fractional and tubeless test meals. Intestinal absorption test, vitamin absorption test, the Congo red test for amyloidosis and faecal fat estimations. Diseases of the muscle. Lipidaemias, hyper and hypolipo prteinemia-definition, causes and investigation, porphyria and porphyrinuria, Definition, causes, consequences and investigation of some inborn-errors of metabolism-phenyiketouria, galactosaemia, fructose intolerance, albinism, alkaptonuria, aminoacidurias, causes and investigation.

CPY 512: Clinical Endocrinology (2 units)

Physiology of the thyroid glands, adrenocorticotrophic hormone and adrenal glands, Mechanism of control and laboratory assessments. Disorders of the endocrine glands and methods of laboratory assessment. The biochemical secretions of the gland, their major metabolites and

laboratory methods investigation. Parathyroid hormones, calcium and phosphorus metabolism, disorders of the bone. Vitamin D, calcitonin, insulin and glucagons. Blood glucose, homeostasis. Diabetes, Laboratory diagnosis and Biochemical sequelae.

CPY 513: Chemical Pathology III (3 units)

Physiology of the kidney, renal clearance and glomerular filtration rate. Renal plasma flow, maximal tubular excretory and reabsorptive capacities. Urea clearance, Creatinine and insulin clearance. Concentration and dilution tests. Impairment of renal function. Renal failures, Azotaemia, anuria, sodium loss in renal disease.

The liver: anatomy and physiology, biosynthesis of bilirubin excretion of bile pigments. Jaundice: urine and blood urea and ammonia urinalysis. Paraproteinaemia, Bence Jones proteinuria and significance. Porphyrurias causes, symptoms and laboratory investigation of porphyrinaemia. Definition causes consequences and investigation of some inborn-errors of metabolism- phenylketonuria, galactosaemia, fructose intolerance, albinism, alkaptonuria, aminoacidurias, causes and investigation of nutritional disorders.

CPY 514: Clinical Vitaminology And Toxicology (2 units)

Chemistry and metabolic functions of water and fat soluble vitamins, their deficiency states and physiological significance. Trace elements, bioavailability functions and interaction. Practical and theoretical aspects of poisoning. Estimation of blood alcohol. Detection of barbiturates, cocaine, heroine, opium, phenothiazines, methaqualone etc. in urine, sweat, blood aspirates. Estimation of blood salicylates, sulphonamides, blood ammonia, cyanide, oxygen, carbon dioxide and **PH**.

CPY 515: Clinical Enzymology (2 units)

Metabolic processes reaction kinetics, activation and repression phenomena. Enzyme induction, inhibition, purification and specificity, enzyme activity and kinetic studies. Cenzymes, isoenzymes, enzymes of clinical diagnostic importance.

CPY 517: Advanced Chemical Pathology Techniques (3 units)

Principles and applications of various chromatographic and electrophoretic techniques including high-pressure liquid chromatography. Measurement of radioactivity application, separation and analysis of body fluid constituents. Membrane separation, dialysis, electro dialysis, ultracentrifugation and ultrafiltration. Immunological methods RIA, ELISA, counter immunoelectrophoresis, receptor assays. Cell cloning, preparation of monoclonal antibodies. Fluorescent antibody technique, competitive protein binding methods. Electrochemistry: Basic concepts involving animal experiments, micro and ultramicro analysis. Gasometric analysis, molecular and atomic absorption, emission fluorescent, UV, visible and infra-red spectrophotometry.

Automation and computer applications in clinical biochemistry laboratory, quality assurances. Safety and biohazards equipment care and maintenance. Elements of biotechnology.

MLS 505 and 506: Lab Posting 6 units

MLS 584: Seminar 2 units

MEDICAL MICROBIOLOGY/MYCOLOGY UNIT

MLS 592: Project (6 units)

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

MLS 503: Research Methodology (2 units)

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

MMB 521: Medical Microbiology II (2 units)

Principles of bacterial infection and pathogenesis. Biological and clinical basis of infectious diseases, clinical and diagnostic micrological considerations of diseases of upper respiratory. Lower respiratory, genitourinary and intestinal tracts, central nervous system, cutaneous, and vascular and other systemic organs. Definition, assessment, epidemiology and control of hospital infections.

MVL 572: Medical Virology II (2 units)

Pathogenesis, immunology, epidemiology and management of viruses of medical importance psittacosis group, rickettsiae, picornaviruses, arboviruses, herpesviruses, myxoviruses, poxviruses, oncogenic viruses.

PME 551: Advanced Parasitology/Epidemiology (2 units)

Epidemiological study of protozoa and helminthic infections in rural communities. Advanced methods for differential diagnosis of parasitic immunology of parasitic infections. Definitions and principles of epidemiology, methods and uses of epidemiological studies. Epidemiology and control of common communicable and non communicable diseases.

MMB 525: Public Health Microbiology (2 units)

General principles of microbial disease transmission waterborne, airborne, food borne, arthropod-borne and contagious disease. Principles and techniques for water treatment. Waste water disposal

preventive measures in the control of bacterial, parasitic and viral infections, vaccines and immunization, immunization programme and schedule (EPI).

MMB 526: Microbial Genetics (2 units)

Nucleic Acid, History of nucleic acid, structure and function, DNA & RNA, DNA replication. Protein synthesis and regulation, regulations of transcription and Translation, Molecular biology techniques, Polymerase Chain Reaction (PCR), Restriction, fragment length polymorphism, mutation, mutagenic substances, recombinant DNA Technology, Application of Molecular Biology Techniques in diagnosis of infectious diseases.

MMB 527: Medical Mycology (1 units)

Biology of fungi: nomenclature, classification, characteristics and growth requirements of fungi, Epidemiology pathogenesis and control of fungi infections. Systemic mycoses cryptococcosis, blastomycoses, histoplasmosis, coccidiomycoses, Opportunistic mycoses-candidiasis, phycomycoses, aspergilloses etc. subcutaneous mycoses-maduromycoses, sporotrichoses, chromoblastomycosis etc. cutaneous mycoses-dermatophytoses, superficial mycoses. Actinomycoses, mycotoxins, laboratory diagnosis of fungi infections.

MMB 529: Pharmaceutical Microbiology And Advanced Techniques (2 units)

Automation in Microbiology preparation and standardization of Bacterial antigens and immune-sera. Preparation of Haemolytic Immune body chessboard titration, labelling techniques, characteristics of ideal antimicrobial mechanisms of action of antimicrobial agents, Antimicrobial Resistance susceptibility tests, measurement of antimicrobial agent levels in body fluids.

MLS 505 and 506: Lab Posting 6 units

MLS 584: Seminar 2 units

HAEMATOLOGY /BLOOD TRANSFUSION SCIENCE UNIT

MLS 592: Project (6 Units)

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

MLS 503: Research Methodology (2 units)

Introduction to research methodology collection of literature review articles. Problem definition sampling techniques experimental designs of medical and public health studies. Questionnaire design and data collection analysis. The role of research in health and social welfare, the need of

institutional and governmental ethical clearance for some research projects. Research projects. Art of scholarly publications.

HAE 531: Haematology II (2 units)

Identification of blood parasites. The spleen and splenomegaly syndromes. Drugs, chemicals and the blood, Blood in infancy childhood and pregnancy, Heredity and blood disorders, Blood in microbial infection. Anemia in community classification, mechanism and laboratory investigations in immunohaematological disorders. Autoimmune haemolytic anaemias, thrombocytopaenia, leucopenia, systemic and disseminated lupus erythematosus, rheumatoid arthritis, etc. myelomatosis and other paraproteinaemias.

HAE 532: Cytogenetics (2 units)

Sex chromosome, in-activation of e-xchromosomes. Theory and practice of clinical cytogenetics, Mosaicism, mapping of autosomes and x-chromosomes. DNA Synthesis. Genes in kindred segregation, dominant and recessive inheritance x-linked inheritance, Independent assortment, linkage and association allelism, Genes and the individual. Gene variation and interaction. Chimeras, Genes in families and population. Selection, pedigree analysis, mutation and mutagens. Hardy Weinberg equation; genetic drift and inbreeding, methods of cytogenetic analysis including staining. Chromosome abnormalities Trisomy, monosomy, Translocation, non-disjunction, deletion, duplication, isochromosomes, Clones, Slide reporting.

HAE 533: Blood Group Serology 1 (3 units)

Genotyping in Rh Blood Group. Other blood groups NNS, Kell, Kidd, Duffy, Lewis, P.I etc. Haemolytic disease of the Newborn types, aetiology, antenatal and postnatal management. Blood group serology in paternity dispute. Haemolysin titration. Absorption and Elution Techniques, Indications and complications of blood transfusion. Red cell survival tests Radioisotope and differential agglutination methods. Screening of donor for infective agents. HIV, HBV, Malaria, Trypanosomes, Syphilis etc. Anomalous results in blood grouping. False positive and negative results in compatibility testing. Preparation and standardization of AHG.

HAE 536: Advance Blood Group Serology Techniques (2 units)

Serology Techniques: Technique for Emergency, Compatibility testing, Special compatibility technique, Preparation of enzymes used in Blood Group Serology , Coombs test, paternity disputes – Automation in Blood Group Serology – Groupmatic, Technician autoanalyzers for antibody and antigens detection, Pipette washers. Exchange and extra corporal blood transfusion.

HAE 537: Advanced Haematology Techniques (3 units)

Principles and techniques of isoelectric focusing. Protein separation by column chromatography, Finger printing principles and techniques. Purification of proteins/enzymes. Ultracentrifugation and molecular weight determination, Culture of blood cells and parasites. Leucocyte typing Platelet aggregation principles and techniques. Isotope labeling techniques. Measurement of radioactivity, Fluorescent antibody techniques, radio-immuno-electrophoresis, Competitive protein binding, Electrophoresis Starch, Agar gel and polyacrilamide gel, Principles of polymerase.

HAE 535: Blood Group Serology II (2 units)

Leukocyte and platelet antigens and Antibodies. Red cell membrane structure and diseases. National Blood Transfusion Service (NBTS).

Blood substitutes, preparation of commercial quantities of polydonal antisera, principles and techniques of producing monodonal antibodies.

Quality assurance in Blood Group Serology WHO standards.

MLS 505 and 506: Lab Posting 6 units

MLS 584: Seminar 2 units

HISTOPATHOLOGY/CYTOLOGY UNIT

MLS 592: Project (6 Units)

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

MLS 503: Research Methodology (2 units)

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

PTH 541: Histopathology II (2 units)

Review of histology of the following organs Cardiovascular, Respiratory, Gastrointestinal, Urogenital, Neuro-histology and histology of the following: - endocrine glands pituitary, thyroid, pancreas, adrenal, ovary and testis. Cytology of epithelial cells, atypical and malignant cells.

PTH 543: Histopathology III**(3 units)**

Systemic pathology; heart–hypertensive, heart-disease heart failure and cardiomyopathies. Respiratory Tuberculosis, pneumonia, renal nephropathy associated the infestations and infections, glomerulonephritis.

Lymphoreticular Malignant lymphomas (non-hodgkins & Hodgkins lymphoma, burkitts). Idiopathic Tropical splenomegaly syndrome.

Gastrointestinal tract – Cancers of the mouth, esophagus, intestines and stomach.

Liver – Hepatitis, Cirrhosis, Primary Liver cell carcinoma

Female Reproductive Organs – Pelvic inflammatory disease.

Cancer – Cervical, trophoblastic, ovarian.

Skin – Leprosy, kaposi sarcoma.

Nutritional – Protein energy malnutrition. Slide reporting.

PTH 545: Exfoliative Cytology**(3 credit units)**

Introduction to exfoliative cytology. Definitions and principles of exfoliative cytology methods. Diagnostic criteria for all malignancy. Kinds of tumors sampling, fixation and staining techniques in clinical cytology. Gynae-cytology. Hormonal evaluation. Cells and other constituents in sputum effusions. CSF. Urine and other fluid, slide reporting. Cytology of epithelial cells, atypical and malignant cells.

PTH 547: Advanced Histopathology Techniques/Embalmmnt**(3 units)**

Fluorescent Microtechniques. Autoradiography principles and techniques. Ultramicrotomy, Microincineration, principles of photography macro and microphotography. Preparation of stained smears and specimen for microphotography and microphotography respectively. Election microscopy preparation of materials and embedding reagents uses. Toxicity of some reagents used in election microscopy. Embalmmnt techniques and demonstrations.

PTH 542: Cytogenetics**(2 units)**

Theory and practice of clinical cytogenetics. Chromosome analysis, structure organization and staining techniques. Chromosome in man. Normal karyotype and chromosomal abnormalities. Mosaicism, trisomy, monosomy, translocation, klinefelters and turner's syndromes, sex-chromatic disorder, inactivation of sex-chromosomes and sex determination. Genetic diseases. Clones, mapping of autosomes, dNA synthesis, genes in kindred segregation. E-linea inheritance. Chimeras, genes in families and population. Selection, predegree analysis, mutation and mutagens, Hardy-Weinberg equation, genetic drift, inbreeding. Sliding report. Philadelphia and Christ Church chromosomes.

PTH 546: Museum Techniques (2 units)

Preparation and Museum mounting of specimens. Techniques of museum display. Organization of a Medical Museum. Methods of colour maintenance. Fixation and storage of museum specimens. Special museum techniques e.g. Dawson's method.

MLS 505 and 506: Lab Posting (6 units)

MLS 584: Seminar (2 units)

PARASITOLOGY/MEDICAL ENTOMOLOGY UNIT

MLS 592: Project (6 units)

PME 551: Advanced Parasitology /Entomology I (2 units)

See Medical Microbiology Units

PME 553: Medical Entomology I (2 units)

Diseases causing arthropods (including Myiasis) – Classification, Habitats, Life cycle, Transmission and Control. Arthropods as intermediate hosts and vectors of parasites. Insecticide resistance.

MLS 503: Research Methodology (2 units)

See Histopathology/Cytology Unit

MMB 527: Medical Microbiology (1 units)

See Medical Microbiology Unit

MMB 526: Microbial Genetics (2 units)

See Medical Microbiology Unit

PME 555: Parasitological Techniques (3 units)

ROUTINE Stool examination: Thin film, Saline, Iodine, and Concentration Techniques (Formol ether, concentration and floatation method).

Examination of Parasites In Blood: Concentration of blood for examination, determining size of parasites by micrometry.

Micro method of analysis in the Parasitology Laboratory.

Urine Examination in the Clinical Laboratory.

Sero diagnosis of parasitic disease.

Parasitological Fixation: Protozoa, Helminthes, Helminthes eggs and Larvae, arthropods fixation.

Preparation of parasities for study by fixation.

Preparation of permanent Smears: Trichrome Staining techniques, fixation and staining procedures, staining behaviour of organisms.

Iron haematoxylin staining of parasites: The Spenser, Monroe and Tompkins-Miller method.

Cultural method in Parasitology involving tube and Petri-dish methods, filter paper slant, charcoal and Bear man's technique.

Egg Studies: Cellophane covered thick smear. Estimation of worm burden, diluting, hatching helminthes, culture and search for tapeworm scolex.

MVL 572: Medical Virology II (2 units)

See Medical Microbiology unit.

MLS 505 and 506: Laboratory Posting (6 units)

MLS 584: Seminar (2 units)

IMMUNOLOGY/MOLECULAR BIOLOGY UNIT

MLS 592: Project (6 units)

MLS 503: Research Methodology (2 units)

See Histopathology/Cytology Unit.

IMM 561: Laboratory Methods for Detection of Antigens and Antibodies (3 units).

Immunodiffusion

Electrophoresis

Immunochemical and Physiochemical

Radioimmunoassay

Immunolistochemical techniques

Agglutinations

Complement Function

Complement Fixation.

Laboratory Methods of Detecting Cellular Unirune function

Delayed hypersensitivity skin test

Lymphocyte actuation (... and unlufulation)

Assay for Human T&B lymphocytes

Clinical application of B & T cells assays

Neutrophils function (test for inutility, recognition, inGSTtion, degranulation, centacellular killing).

IMM 563: Molecular Cell-Biology and Biotechnology (2 units).

- Cell theory, cutina of living cells, evolutionary origin of cell types, fundamental differences between no. and Eukaryotes, importance of archeac for biotechnology.

- Clinical components of cells, molecules of life / proteins, unclear acid, lipids, KH), in-fact of rec. proteins, - proteins folding for biotech, use of fluorescent proteins as biosensors, monoclonal antibodies, principles of hybridization, PCR, DNA-Chips.
- The nuclear and molecular constituents, DNA replication and recombination, genome organization, principles of recombinant gene technology.
- From genes to proteins, gene expression, molecular anatomy of genes, regulation of gene activity, reporter genes.
- Eukaryotic cell organizations and sub-cellular structures.
- Cytoskeleton, extra-cellular matrix, cell culture.
- Cell cycle and growth regulation and diseases.
- Structure and function of biomenbianes, role of reception.
- Integrative and afecialized cellular events; intracellular signal transduction.

IMM 565: Molecular Methods in Microbiology

(2 units).

- Coexistence of bacteria in complex communities in nature in as well as in manmade eco-systems.
- Natural and manmade environments and unusual ecological niches of bacteria.
- The VRNA approach.
- Understanding and molecular basis of phylogenetic tees of bacteria (bact. Ecology).
- Molecular methods to analyze uncultivable bacteria.
- Existence growth and analysis of structure of biofilms.
- DNA fingerprinting techniques in molecular ecology.
- Microscopic analysis of bacteria.
- Fluorescence – in – siter hybridizations.
- PCR reactions and analysis of mixed PCR products.

IMM 562: Clinical Immunology

(2 units).

- Immunodeficiency diseases
- Rheumatoid diseases
- Allergic diseases
- Gastro -inlostinal and livers diseases
- Candial and pulmonary diseases
- Renal diseases
- Dermatological
- Infectious diseases

- Endocrine diseases
- Infectious disease
- Parasitic disease

IMM 564: Immunohaematology

(2 units)

- White blood cells disorders
 - a) chronic hydrogenous leukemia
 - b) chronic lymphocytic leukemia
 - c) leukaemia reticuloendothelosis

lymphoreticular Disorders

lenkocytopenia

- Rd Cell disorder
- Immune hemolytic anemia
 - a) autoimmune hemolytic anemia
 - b) cold agglutinin syndromes
 - c) drug induced immune hemolytic anemia
 - d) paroxysmal cold hemoglobinuria
- Plate disorders
- Iron marrow transplants
- Hemostatic disorders
- Blood replacement therapy

IMM 567: Immunochemistry

(3 units)

Adaptive and innate immunity

- Cells involved in the immune response
- Major histocompatibility complex
- Antigen – antibody reactions
- The antibody response
- The generation of antibody diversity
- Cell-mediated immunity
- Synthesis of immunogens
- Production of mono and polydonal of antibodies
- Preparation of antibody fragments
- Purification of antibodies and their fragments
- Labeling of antibodies with radioactive isotopes, dyes and enzymes.
- Analytical methods which use antibodies (e.g. Immunoassays, western blotting).

- Affinity chromatography
- Immunohistochemistry.

MLS 505 and 506: Laboratory Posting (6 units)

MLS 584: Seminar (2 units)

N/B: Medical Virology Unit is being developed.

ADDITIONAL INFORMATION

Grading System:

A student's work in the university is presently graded in the following letters and each of the letters carries an equivalent number of grade points thus:

S/N	% Score	Letter Grade	Points	Rating
1.	0% and above	A	5.00	Excellent
2.	60-69	B	4.00	Good
3.	50-59	C	3.00	Average
4.	45-49	D	2.00	Satisfactory
5.	40-45	E	1.00	Fail

To determine the final grade a student receives in a course at the end of a semester, 30% weight is given to the continuous assessment and 70% to the semester examination

Grade Point Average

At the end of each semester a student's grade point average is worked out. Supposing he or she offers the following courses:

Department	Course No	Course Title	Unit
GST	111	Use of English	2
BIO	111	General Biology 1	2
CHM	111	General Chemistry 1	2
MTH	111	Elementary Maths1	3
PHY	111	General Physics1	3
GST	119	Social and Cultural Anthropology	2
CHM	112	Physical Chemistry	2
CHM	113	Basic Practical Chemistry	1
GST	117	French / German	1
PHY	113	Basic Practical Physics	1
BIO	113	Genetics	3
Total credit unit			23

And assuming that he or she obtains A, B, D, A, C, E, F, A, B, D, and C. respectively according to the grading system the total point of each course will be worked out as follows:

GST	111	2(UNITS)	x	5 (A)	=	10 (points)
BIO	111	2 ditto	x	4 (B)	=	8 (points)
CHM	111	2 ditto	x	2 (D)	=	4 (points)
MTH	111	3 ditto	x	5 (A)	=	15 (points)
PHY	111	3ditto	x	3 (C)	=	9 (points)
GST	119	2 ditto	x	1 (E)	=	2 (points)
CHM	112	2 ditto	x	0 (F)	=	0 (point)
CHM	113	1 ditto	x	5 (A)	=	10 (points)
GSE	117	1ditto	x	4 (B)	=	4 (points)
PHY	113	1ditto	x	2 (D)	=	2 (points)
BIO	113	3 ditto	x	3 (C)	=	9 (points)
Total points					=	73

The total credit unit is 23 while the total point is 73. In order to find the grade point average, the total number of points 73 is divided by the total number of credit unit 23 to give a grade point average of **3.17**

Another important fact that must be stressed is that from the time a student is first registered for the degree programme whatever grade he or she obtains will count at the end of his or her studies. It is therefore very important that students attend classes regularly and do their class assignment with all seriousness.

Classification of Degree

The degree is classified as follows using the five point scale system

First Class (Hons):	4.50 – 5.00
Second Class (Hons): Upper division	3.50 – 4.49
Second Class (Hons): Lower division	2.40 – 3.49
Third Class (Hons):	1.50 – 2.39
Pass:	1.00 – 1.49
Fail:	0.09 – 0.99

DRESS CODE

Dress Code is Blue trousers and Blue Skirt for male and female respectively. Also Red Tie and Red Scarf for male and female respectively.