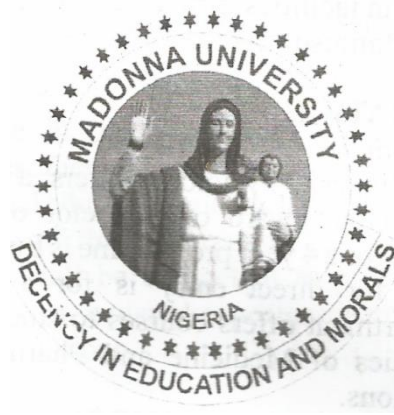


**MADONNA UNIVERSITY
ELELE CAMPUS, NIGERIA**



**FACULTY OF BASIC MEDICAL SCIENCES
DEPARTMENT OF PHYSIOLOGY**

**Revised Academic Programme
2016/2017**

HISTORY

The Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, Madonna University was established in 18th September, 2002 with twenty-two students as its first intake under Dr Ufearo C. S. as the first Head of Department. This was sequel to the approval from the University Senate and the National University Commission.

Philosophy

The philosophy of the Department of Physiology, Faculty of Basic Medical Sciences, College of Medicine, Madonna University takes its cue from the broad philosophy of the College of Medicine in the country and from that of the University. The philosophy of the Department of Physiology is as follows:

- a. Training of B.Sc. (Hons) Physiology students.
- b. Training of medical students towards the degree of MB. BS. during their two pre-clinical years basic and applied physiology.
- c. Rendering intra-faculty training services to B.Sc. Anatomy students and inter-faculty training services to Pharmacy and Health Science (Medical Laboratory Sciences, Nursing Sciences, Public Health, and Optometry) undergraduates.
- d. Researching into various disciplines in physiology.

Objectives and Scope of the Programme

The objective of this undergraduate programme is to produce graduates in the field of Human Physiology:

- a. To staff this University, existing and many emerging medical schools in the country
- b. To teach in medical, pharmaceutical and nursing schools

- c. To perform effectively in other areas where knowledge of Human Physiology is applied: Safety and Environmental matters, Drug Industries, Human Biology, Nutrition, Sports and Research Institutions etc.
- d. To produce professionals in the discipline for the effective implementation of Postgraduate training plans of the department: the professional qualification in Human Physiology is Ph. D. Degree.
- e. To engage in independent study or research to inculcate in themselves. The culture of academic responsibility for further professional education and training. The scope of this programme is such that Human Physiology graduates shall be competent to practice in private and public institutions or undertake postgraduate training in any local or foreign institutions.

ADMISSION REQUIREMENT

UTME

Candidates for 4 years degree programme must obtain the approved pass mark in the Unified Tertiary Matriculation Examination (UTME) and must have at least five credit O' Level passes in English Language, Biology, Physics, Chemistry and Mathematics in not more than two sittings in the West African School Certificate Examination or in the Senior Secondary Certificate Examination or National Examination Council.

Direct Entry

Direct entry candidates for the 3 year programme are required to pass the General Certificate Examination (A' Level) or obtain principal level passes at High School Certificate Examination in Physics, Chemistry, Zoology or Biology.

Duration of Programme

The Department of Physiology offers a 3 or 4 year degree programme leading to the award of Bachelor of Science in Human Physiology. Admission for a 4 year programme is by entrance examination (UTME). Admission for direct entry is for a 3 year programme. Additionally, the department offers courses to students admitted to take degrees in the Faculties of Medicine and Pharmacy leading to their professional examinations.

Job Opportunities

Successful students in the Bachelor of Science degree examination are well-equipped for careers in hospitals, work in well-equipped laboratories and lecture in universities, act as representatives for medical and pharmaceutical firms, or be appointed as technical assistants in research or routine laboratories.

Course Coding System

Course codes contain an abbreviation letter code of three letters representing the department offering the 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 the first semester; even number represents second semester).

STRESS AREAS

Introductory Physiology	0
Respiratory Physiology	1
Cardiovascular Physiology	2
Neurophysiology	3
Gastrointestinal Tract Physiology	4
Reproductive Physiology	5
Renal System	6
Endocrinology	7
Pathophysiology	8
Project/Laboratory Experiments/Seminar	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

YEAR ONE: FIRST SEMESTER

Course Code		Course Title	Units
<i>Required Ancillary Courses</i>			
BIO	101	General Biology I	3
CHM	101	General Chemistry I	3
CHM	171	Basic Practical Chemistry I	1
MTH	101	General Mathematics I	3
PHY	101	General Physics I	3
PHY	105	General Physics Laboratory I	1
<i>General Studies Courses</i>			
GST	111	Communication in English I	2
GST	113	Nigerian Peoples and Culture	2
GST	121	Use of Library, Study Skill and Information Technology	2
GST	123	Communication in French	2
GST	125	Introduction to Entrepreneurship Studies I	2
Total			24

YEAR ONE: SECOND SEMESTER

Course Code		Course Title	Units
<i>Required Ancillary Courses</i>			
BIO	102	General Biology II	3
BIO	172	General Biology Practical	1
CHM	102	General Chemistry II	3
CHM	172	Basic Practical Chemistry II	1
CSC	104	Introduction to Computer Science	2
MTH	102	General Mathematics II	3
PHY	102	General Physics II	3
PHY	106	Basic Physics Laboratory II	1
<i>General Studies</i>			
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
Total			23

YEAR TWO: FIRST SEMESTER

Course Code	Course Title	Units
Core Courses		
PIO 201	Introductory Physiology & Haematology	3
PIO 223	Cardiovascular Physiology	2
Required Ancillary Courses		
ANT 211	Intro. to Anatomy, Gross Anatomy of Upper & Lower Limbs	3
ANT 221	Histology of Basic Tissues	2
ANT 231	General Embryology	2
BCH 201	General Biochemistry I	2
BCH 261	General Biochemistry Practical I	1
MCB 211	General Microbiology	2
General Studies		
GST 215	Introduction to Entrepreneurship Studies II	2
GST 211	Fundamental Theology	1
Total		20

YEAR TWO: SECOND SEMESTER

Course Code	Course Title	Units
Core Courses		
PIO 222	Respiratory Physiology	2
PIO 232	Neurophysiology I	2
PIO 264	Renal Physiology, Body fluids & Temperature Regulation	2
Required Ancillary Courses		
ANT 212	Gross Anatomy of Thorax, Abdomen, Pelvis & Perineum	3
ANT 222	Systemic Histology I	2
ANT 232	Systemic Embryology	2
ANT 242	Neuroanatomy I	2
BCH 202	General Biochemistry II	2
BCH 234	Nutrition and Nutritional Biochemistry	1
General Studies		
GST 162	Introduction to Social Science	2
GST 222	Peace & Conflict Resolution	2
GST 224	Fundamental Ethics	1
GST 252	Bioethics	1
Total		24

YEAR THREE: FIRST SEMESTER

Course Code	Course Title	Units
Core Courses		
PIO 333	<i>Neurophysiology II</i>	2
PIO 341	<i>Gastrointestinal Physiology</i>	2
PIO 355	<i>Endocrinology and Reproduction</i>	2
Required Ancillary Courses		
ANT 311	Gross Anatomy of Head and Neck	3
ANT 321	Systemic Histology II	1
ANT 341	NeuroAnatomy II	2
BCH 301	Special Topics in Medical Biochemistry	3
BCH 317	Chemistry and Metabolism of Proteins & Nucleic Acids	2
PHA 321	Introductory Pharmacology	2
MCB 321	Basic Immunology & Immunochemistry	2
Total		21

YEAR THREE: SECOND SEMESTER

Course Code	Course Title	Units
Core Courses		
PIO 322	Exercise And Sports Physiology	3
PIO 324	Advanced Cardiovascular Physiology	2
PIO 334	Special Senses	2
PIO 392	Animal Experimentation/Design of Experiments	3
PIO 394	Seminar	2
Required Ancillary Courses		
PHA 322	Systemic Pharmacology	3
STA 312	Biostatistics	2
Total		17

YEAR FOUR: FIRST SEMESTER

Course Code	Course Title	Units
Core Courses		
PIO 431	Advanced Central Nervous System	3
PIO 433	Hypothalamus-Hypophyseal Physiology	2
PIO 443	Advanced Human Nutrition	3
PIO 481	Environmental Physiology	3
PIO 483	Pathophysiology	3
PIO 491	Research Methodology In Physiology	3
Total		17

YEAR FOUR: SECOND SEMESTER

Course Code	Course Title	Units	
Core Courses			
1	PIO 472	Advanced Endocrinology	3
2	PIO 492	Physiological Instrumentation And Techniques	3
3	PIO 494	Laboratory Practice In Clinical Physiology	3
4	PIO 496	Project/Oral Defence	6
Total		15	

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Course Code	Course Title	Units
GST 111	Communication in English I	2
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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

SYNOPSIS OF COURSES

FIRST YEAR

GST 125: Introduction to Entrepreneurial Studies I (2 Units)

Introduction to entrepreneurship and new venture creation; entrepreneurship in theory and practice, The opportunity, forms of business, staffing, marketing and the new venture; Determining capital requirements, Raising capitals, financial planning and management; starting a new business feasibility studies, innovation; legal issues; insurance and environmental considerations.

GST 111: Communication In English I (2 Units)

Effective communication and writing in English language skills. Writing of essay, letters, speeches, public announcements, minutes of meetings and term papers. Reading and listening comprehension. Construction of Sentences, outlines and paragraphs. Collection and organization of materials and logical presentation/punctuation.

GST 113: Nigerian Peoples And Culture (2 Units)

Study of Nigerian history, culture and arts in pre-colonial times. Nigerian's perception of his world. Nigerian cultures and their characteristics. Evolution of Nigeria and their characteristics. Evolution of Nigeria political system, Indigene/ settler phenomenon. Concepts of trade, Economic self reliance, Social justice, Individual and national Development, Norms and values, Negative attitudes and conducts (cultism and related vices), Re-orientation of moral and national values, Moral obligations of citizens and Environmental problems.

GST 121: Use Of Library, Study Skills and Information Technology (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-materials etc. understanding library catalogues(CARD OPAC etc) and classification, copyright and its implications, Database resources, Bibliographic citations and referencing. Development of modern ICT, hardware technology, software technology, input devices, storage devices ,output devices, word processing skills (typing, etc).

GST 123: Communication in French (2 Units)

Introduction to French, alphabets and numeracy for effective communication (written and oral) conjugation and simple sentence construction based on communication approach, sentence construction, comprehension and reading of simple text.

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

A brief survey of the main branches of philosophy, logic special symbols in symbolic logic conjunctions, negation, affirmation, disjunction, equivalent and conditional statement laws of torts. The method of deduction using rules of inference and bi-conditionals qualification theory. Types of discourse, Nature of arguments, validity and soundness, Distinction between deductive and inductive inferences. Etc. illustration will be taken from familiar texts including literature materials, Novels, law reports and news paper publications.

GST 122: Communication in English II**(2 Units)**

Logical presentation of papers, phonetics, instruction of lexis, Arts of public speaking and oral communication, figures of speech, precise report writing.

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 meneistics and hermenteutic; without meneistics a philosophical contention might remain elusive, without hermeneutic a syntactic exercise in futility.

BIO 101: General Biology I (3 Units)

Cell structures and organization; Plant and animal cells, Function 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 organisms. 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. Elementary biochemistry of carbohydrates, protein, lipid and nucleic acids.

CHM 101: General Chemistry 1**(3 Units)**

Atomic Structure and periodic table. Development of Configuration of Elements. Stoichiometry and mole concept. Electronic theory of atoms and valency. Chemical bonding. Formular and IUPAC basic nomenclature of compounds, Properties of gases; Equilibria and Thermodynamics; Chemical Kinetics; Electrochemistry. Radioactivity and its application. Phase equilibrium, study of one and two components systems.

CHM 102: General Chemistry II**(3 Units)**

Historical survey of the development and importance of Organic Chemistry; Nomenclature and classes of organic compounds; Homologous series; Functional groups; Isolation and Purification of organic compounds; Qualitative and quantitative organic chemistry; Stereochemistry; Determination of structure of organic compounds; Electronic theory in organic chemistry; Saturated hydrocarbons; Unsaturated hydrocarbons. Periodic table and Periodic Properties; Valence Forces; Structure of solids. The Chemistry of selected metals and non-metals. Qualitative analysis. Structure of solids. Kinetic theory of gases and gas laws. Colligative properties of dilute solutions. Raoult's law, Henry's law and molecular weight determination. Thermochemistry and Hess's law. Chemical equilibrium. Law of mass action, reaction rate and chemical energetics. Electrochemistry, Ionic equilibria. Theory of acids, bases and indicators.

CHM 171: Basic Practical Chemistry I**(1 Unit)**

The theory and practice of simple volumetric and qualitative analysis. Simple organic preparations, reaction of functional groups and physical determinations.

PHY 101: General Physics I

(3 Units)

(Mechanics, Thermal Physics and Waves) Space and Time, Units and dimension, Kinematics; Fundamental Laws of Mechanics, statics and dynamics; work and energy; Conservation laws. Elasticity; Hooke's law, Young's shear and bulk moduli, Hydrostatics; Pressure; buoyancy, Archimedes' Principles., Surface tension; adhesion, cohesion, capillarity, drops and bubbles. Temperature; heat; gas laws; laws of thermodynamics; kinetic theory of gases. Sound, Applications. Measurements, Units and Dimensions. Linear motion. Relevance of linear kinematics to science and physiological effects of accelerations. Motion in a circle and simple harmonic motion. Gravitation, statics and hydrostatics, elasticity, friction, viscosity and surface tension. Heat, temperature, thermometers. Expansion of solids, liquids and gases. Gas exchanges in terrestrial organism. Heat transfer, change of state. Heat regulation in animals, low temperature in biology and in medicine. Waves and resonance ultra sound and its application. Practicals: General measurements and error analysis, simple experiments in mechanics and properties of matter. Heat and thermodynamics. Kinetic model of gas, A model for solid. Properties of metals

PHY 105/PHY 106: General Physics Laboratory I & II (1 Unit each)

This laboratory based course emphasize quantitative 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 systems, light, heat, viscosity, etc. covered in PHY 101 & PHY 102.

MTH 101: General Mathematics I**(3 Units)**

(Algebra and Trigonometry) Real number system: simple definitions 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 set functions. Permutations and combinations. Binomial theorems of any index. Circular measures, trigonometric function of angles of any magnitudes. Addition and factor formulae. Complex numbers: algebra of complex numbers, the Argand diagram, De Moivre's theorem, n-th root of unity.

CSC 104: Introduction to Computer Science**(2 Units)**

History of Computer Science and their generations; Computer Hardware; functional components Modern I/O units. The meaning of a computer origin, classification: Analog, Digital and Hybrid. Types of Digital computers: 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 software: The high-level and low-level. The computer and the language levels. Examples of systems software, Interpreters, compilers, and translators. The function of system software; the functional units of a digital computer; Examples of application software packages. Data processing and data processing centers. Criteria for using a computer. Type of computer users' interface. The types of printers. Introduction of the internet.

BIO 102: General Biology II**(3 Units)**

Levels of organization. Origin and History of classification. Principles of Binomial nomenclature. Hierarchical classification. Molecular classification of bacteria. structure, morphological features and chemical nature of viruses. Kingdom monera; Habitat, structure and morphological characteristics and life cycle of; Cyanobacteria, Archaeobacteria, Eubacteria. Kingdom Protista;- Habitat, structure and morphological characteristics and life cycle of protozoans, algae and slime moulds. Kingdom Mycota;- Habitat, structure and morphological characteristics and life cycle of; ascomyctes, deuteromyctes, zygomycytes and oomycytes. Kingdom Plantae- Habitat, structure and morphological characteristics of bryophytes, pteridophytes, gymnospermae and angiospermae. Kingdom animalia;- Invertebrate and origin of animal diversity. Symmetry, cephalisation and gastrulation. Habitat, structure and morphological characteristics and life cycle of porifera, cnideria, platyhelminthes, nermetines, rotifers, nematode, acanthocephalia, annelid, mollusca, Echinodermata, and chordate.

BIO 172: 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, and spores, bacteria cells, protozoan specimens and algae. Observation of Plant specimens. Observation of invertebrate animal specimens. Preparation of microscopic slides. Basics of photometry, colorimetry, chromatography, electrophoresis.

CHM 172: Basic Practical Chemistry II**(1 Unit)**

More on theory and practice of simple volumetric and qualitative analysis. Simple organic preparations, reaction of functional groups and physical determinations.

MTH 102: General Mathematics II**(3 Units)**

(Vectors, geometry and dynamics) Types of vectors: points line and relative vectors. Geometrical representation of vectors in 1-3 dimensions. Addition of vectors and multiplication by a scalar. Components of vectors in 1-3 dimensions: direction cosines. Linear independence of vectors. Point of division of a line. Scalar and vector product of two vectors. Simple application. 2-dimensional coordinate geometry: straight lines. Angle between two lines. Distance between points. Equations of circle. Tangent and normal to a circle; Properties of parabola, ellipses, hyperbola, straight lines and planes in spaces; direction cosines; angle between lines; and between lines and planes; distance of a point from a plane; distance between two skew lines.

PHY 102: General Physics II**(2 Units)**

(Electricity, Magnetism and Modern Physics) Electrostatics; conductors and currents; dielectrics; magnetic fields and induction; Maxwell's equations; electromagnetic oscillations and waves; Applications. Propagation of light at plane and curved surfaces. The human eye photosensitive pigments in the eye, colour vision and the insect eye. Optical instruments: Ophthalmoscope and compound microscope. Radioactivity and useful effects of radiation. Current and static electricity, introductory magnetism and alternating currents. Introductory atomic physics and electronics. Practicals: Vibrations, Wave and Optics Magnetism

200 LEVEL

FIRST SEMESTER

ANT 211: Introduction To Anatomy, Gross Anatomy Of Upper & Lower Limbs (3 units)

A History of Anatomy: History of Anatomy from Galen through Hippocrates to the present day. Development Anatomy from Art form to the present day scientific study.

B. Introductory Anatomy:

1. Descriptive terms, planes and terms of relationship of the human body, terms of comparison,
2. Attachment of muscles, types of muscles, movements of joints.
3. Osteology, principles of kinesiology, general organization of body systems.

C. Upper Limb:

1. Pectoral region and mammary gland
2. Axilla and brachial plexus
3. Back
4. Deltoid and scapular regions, arm, forearm, hand, bones and joints.

D. Lower Limb:

1. Front and medial sides of the thigh, gluteal region, back of the thigh
and popliteal fossa
2. Leg
3. Sole of foot, bones and joints.
4. Surface Anatomy, Applied and
5. Radiological Anatomy of Upper and Lower Limbs.

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.

ANT 231: GENERAL EMBRYOLOGY (2 units)

1. Gametogenesis, cyclic changes in the female genital tract, fertilization
2. Cleavage, blastocyst, gastrulation and formation of germ layers
3. Segmentation of mesoderm, folding of embryo, fetal membranes
4. Umbilical cord and placentation
5. Development of limbs
6. Teratology - Developmental anomalies and clinical syndromes.

PIO 201 Introductory Physiology and Hematology (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.

P10 223 Cardiovascular Physiology**(2 units)**

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

BCH 201: General Biochemistry I**(2 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. Biomolecules and the origin of life. The structural units of macromolecules- structures and functions of amino acids, monosaccharides, 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 examples); 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.

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 or 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 ENTREPRENEURIAL STUDIES II (2 units)

The course is a continuation of GST 125 (Entrepreneurial Study 1.). Attention is given to management of people (Personnel Management), material 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 on some of the entrepreneurial skills.

SECOND SEMESTER

ANT 212 Gross Anatomy of Thorax, Abdomen, Pelvis & Perineum (3 units)

A. Thorax:

1. Thoracic wall and Thoracic cavity
2. Pleura and lungs, bronchial tree and bronchopulmonary segments

3. Mediastinum: Subdivisions, Pericardium and the Heart, Great Vessels of the thorax, esophagus, cardiac plexuses, thoracic duct

4. Diaphragm.

B. Abdomen:

1. Anterior abdominal wall and Groin

2. External genitalia

3. Peritoneum,

4. Stomach and intestines, blood supply

5. Liver

6. Pancreas

7. Spleen

8. Kidneys and Suprarenal glands

9. Posterior abdominal wall- muscles and fascia, lumbar plexus, abdominal aorta, IVC

C. Pelvis and Perineum:

1. Male and female perineum

2. Pelvic wall and floor

3. Pelvic peritoneum

4. Viscera, nerves and vessels

5. Surface Anatomy

6. Radiological Anatomy

ANT 222: SYSTEMIC HISTOLOGY I (2 UNITS)

Histology of the:

1. Cardiovascular and lymphoid systems

2. Respiratory system.

3. Digestive system.

4. Urinary systems

5. Genital systems

6. Electron micrograph studies of each organ.

ANT 232 SYSTEMIC EMBRYOLOGY

(2 UNITS)

Development of

1. Cardiovascular system
2. Integumentary system
3. Respiratory system
4. Digestive system
5. Urogenital system
6. Developmental anomalies and clinical syndromes
7. Pharyngeal Apparatus (Head & Neck).

ANT 242: NEUROANATOMY I

(2 UNITS)

1. Neuroembryology
2. Neurocytology
3. Organization of the Nervous System
4. Meninges
5. Spinal cord – Gross anatomy, internal structure, ascending and descending pathways
6. Hindbrain (medulla oblongata, pons & cerebellum).
7. Midbrain

BCH 202: General Biochemistry II

(2 Units)

Structure and Organization of Biological Membranes. Mitochondrial electron transport and oxidative phosphorylation. Photosynthesis: Photoreceptor pigments, light and dark reactions of photosynthesis to include photosystems I and II, cyclic and non-cyclic photophosphorylation and a simple treatment of CO₂ fixation. Metabolism of Lipids: Digestion and absorption of lipids. Role of lipoproteins in lipid transport. Metabolism of lipoproteins in health and disease. Storage and mobilization of energy stores in adipocytes. Fatty acid formation; Introductory bioenergetics. Energy rich compounds. The

role of ATP in energy exchange reactions. Oxidation-reduction. Simple calculations based on these concepts. Carbohydrate Metabolism: Digestion and absorption, in GIT. Glycolysis, citric acid, pentose phosphate and glyoxylate cycles. Gluconeogenesis and a brief outline of glycogenolysis and glycogenesis. Metabolism of amino acids and proteins: Digestion and absorption of protein in the G.I.T. The concept of nitrogen balance and essential amino acids. Amino acid catabolism to include the cellular strategies for deamination and the fate of the C-skeletons; Significance of glutamine and alanine cycles. Urea synthesis. A brief outline of biotransformation processes and detoxification strategies in the metabolism of xenobiotics

BCH 234 Nutrition and Nutritional Biochemistry (1 Unit)

The course in Nutrition is aimed at exposing medical students to the pivotal role of adequate and appropriate nutrition in virtually all health conditions, and how in particular, traditional beliefs, customs and habits in developing countries like Nigeria affect the growth and development of children. The course would serve to bridge the biochemistry course in basic nutrition with exposure to nutrition in pediatrics, medicine and surgery by emphasizing the pathophysiological aspects, major classes of foods and their functions: carbohydrates, fats, protein, vitamins, minerals, trace elements, dietary fibre. Daily food required and recommended intakes, protein calorie malnutritions, biochemical changes in kwashiorkor and marasmus. Role of protein deficiency in growth and development, consequences on organs and in particular brain growth; vitamin deficiencies and consequences of over nutrition – obesity, overweight and consequences; dietary fibre and diseases. Food preservative and adverse effects; Diet and dental disease; Nutrition and cancer, methods for the assessment of nutrition status. Nutritional requirements and nutritional disorders. Biochemical functions of trace

elements. Liposoluble vitamins. Hydrosoluble vitamins. Coenzyme structure and functions

MCB 211: General Microbiology (2 units)

History and scope of microbiology. General characteristics of microorganisms. Classification of bacteria and scientific basis of classification. International code for bacteria nomenclature. Growth, reproduction, sterilization and disinfection of microorganisms. Economic importance of microbes. Effects of the environment on microbial growth

PIO 264 Renal Physiology, Body Fluids and Temperature Regulation (2 units)

The skin: functional anatomy, temperature regulations; abnormalities of temperature regulation. Metabolism: factors regulating metabolism, conditions for measuring basal metabolic rate. Compartmentalization and composition of body fluids. Physiologic anatomy of the kidney, renal circulation and autoregulation. Glomerular filtration. Tubular transport. Urine formation: Counter-current system. Water volume and ionic regulation. Acid-base balance. Micturition. Renal handling of electrolytes. Current concepts of concentration and dilution of urine. The rennin-angiotension system. Renal disorders.

PIO 212 Respiratory Physiology (2 units)

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

PIO 232 Neurophysiology I

(2 units)

Development and general plan of the central nervous system. Functional anatomy of brain and spinal cord. Nerve: morphology, generation and conduction of action potential. Sensory division of the nervous system; morphology of receptors, sensory pathways, reticular formation, thalamus and sensory cortex. Synaptic transmission, neurotransmitters. Basic characteristics of sympathetic and parasympathetic divisions of the autonomic nervous.

GST 222: STUDIES IN PEACE AND CONFLICT RESOLUTION (2 units)

This course focuses on the basic concept of peace and conflict resolution; peace as a vehicle of unity and development; conflict issues; types of conflicts e.g. ethnic/religious/political/economic conflict; root causes of conflict and violence in Africa; indigene/settler phenomenon; peace-building; management of conflicts and security; elements of peace studies and conflict resolution; culture of peace mediation and peace-keeping, Alternative Dispute Resolution (ADR); Dialogue and arbitration in conflict resolution; role of international organization in conflict resolution e.g. Economic Community of West African States (ECOWAS); African Union; United Nations; communal/indigenous conflicts; individual conflict terrorism

300 LEVEL

FIRST SEMESTER

ANT 311 Gross Anatomy of Head & Neck

(3 units)

1. Face and Scalp
2. Cranial Cavity
3. Orbit
4. Parotid region

5. Temporal and infratemporal regions
6. Triangles of neck
7. Submandibular region, nerves and vessels in deep dissection of neck
8. Thyroid and Parathyroid
9. Pre-vertebral region and joints of neck
10. Mouth and Tongue
11. Pharynx
12. Nasal cavity and Paranasal air sinuses
13. Larynx
14. Ear and Eye
15. Radiological and applied anatomy of the Head and Neck..

ANT 321: SYSTEMIC HISTOLOGY II

(1 unit)

Histology of the:

1. Special senses (Eye, Ear & Chemical Senses)
2. Nervous system
3. Endocrine system
4. Skin, gland of the skin, Structure of the nails and hair.
5. Electron micrograph studies of each organ.

ANT 341: NEUROANATOMY II

(2 units)

1. Diencephalon – Thalamus, Hypothalamus, Epithalamus, Metathalamus&Subthalamus
2. Basal nuclei
3. Cerebral hemispheres, sulci and gyri, internal structure of cerebrum
4. Ventricular System of the brain; CSF production, circulation and absorption.
5. Blood supply of the brain

6. Visual and Auditory pathway

PIO 341 Gastrointestinal Physiology (2 units)

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

PIO 355 Endocrinology and Reproduction (2 units)

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

MCB 321: Basic Immunology and Immunochemistry (2 Units)

Basic concepts of immunology, structure of antigens, Antigenic determinants, Cellular response, Genetic of response to response to antigenic stimulations, Structure and classification of immunoglobulins and antibodies. Mechanisms and theory of antibody formation. Antibody interactions, Role of lymphoid tissues and thymus in immune responses, Hypersensitivity, immunopathology, Autopathology, Auto-immunology. Tumor and transplantation immunology.

PIO 333 Neurophysiology II (2 units)

Pathophysiology of pain. The association areas of the cortex. Physiological basis of motivated behaviours. Muscle spindle function in motor control. Maintenance of posture. Mechanism of locomotion.

BCH 317 Chemistry and Metabolism of Proteins & Nucleic Acids (2 Units)

Genome organisation and biosynthesis of proteins. Metabolism of purines and pyrimidines, nucleosides and nucleotides; abnormalities in nucleic acid metabolism-xeroderma pigmentata and skin cancer.

BCH 301 Special Topics in Medical Biochemistry (3 Units)

Biochemistry of Blood and Special Tissues. Composition of Blood and other body fluids. Separation of blood into constituents, Serum proteins – properties and functions, Clotting mechanism. Role of anti-coagulants. Haemoglobin: Structure, properties and functions. Haemoglobin metabolism. Haemoglobins and haemoglobinopathies. Immunochemistry Molecular basis of immune reactions. Structure and function of immunoglobulins. Antigen-Antibody interactions. Immunological laboratory methods. Neurochemistry The neuron: Structure, composition and metabolism. Neurohormonal regulatory mechanism. Metabolic antagonism in neurochemistry. Biochemistry of muscle contraction Endocrinology Structure, function and molecular mechanism of action of steroid, thyroid and polypeptide hormones. Hormonal deficiency diseases and their detection. Methods of hormonal assay. Xenobiotics and Forensic Biochemistry Detoxification mechanisms, metabolism of foreign compounds. Induction of Microsomal enzymes and drug resistance. Medico-legal: Blood, Urine and sweat test. Recent development in forensic techniques.

300 LEVEL

SECOND SEMESTER

P10 322: EXERCISE & SPORTS PHYSIOLOGY (3 UNITS)

Types of exercises

Muscles in exercise

Implication of exercise on muscles and muscle performance

Respiration in exercise

Cardiovascular system in exercise

Body heat in exercise

Body fluid and salt in exercise

Drugs and athletes

Metabolic rate and measurement

Ergometry

PIO 334: SPECIAL SENSES (2 UNITS)

Smell: receptors and pathway

Taste: taste buds and pathway

Vision: structure of the eyeball

Structure of the retina

Visual pathway and effects on lesion

Image forming mechanism

Light reflex

Accommodation

Errors of refraction

Electrophysiology of the eye

Color vision

Color blindness

Dark and light adaptation

Hearing: functional anatomy of the ear

Function of the middle ear

Organ of Corti
Hair cell physiology
Endocochlear potential
Auditory pathways
Sound localization
Pitch
Discrimination of sounds
Deafness

PIO 324: ADVANCED CARDIOVASCULAR PHYSIOLOGY (2 UNITS)

Gross structure of the heart and blood vessels; Cardiac muscle and valve actions; Microscopic structures of the arterial wall Venous structures and pattern of distribution; fenestrated and sinusoid capillaries and endothelial transport. Cardiovascular reflexes; Excitation contraction coupling in cardiac muscle, Basic electrophysiology of cardiac muscle. Regulation of intracellular calcium concentration Cardiac integration and autonomic control of the heart; Excitation contraction coupling in vascular smooth muscle; Vascular and autonomic receptors; Pulmonary circulation and architecture of the pulmonary vasculature; Structural and functional adaptation; Individual circulations; Cardiovascular actions of histamine, the Renin/angiotensin system and the eicosanoids, vasodilator drugs: nitrovasodilators, atrial natriuretic peptides, phosphodiesterase inhibitors. Inhibitors of L-type voltage-operated calcium channels, and endothelium-derived nitric oxide: mechanisms of action of the agents and their role in the treatment of hypertension and angina.

**PIO 392: ANIMAL EXPERIMENTATION/DESIGN OF EXPERIMENT
(3 Units).**

Laboratory animal experimental techniques in physiology – Past and present.

Basic instrumentation, Tissue preparations. Investigation techniques and Design of Experiment Basic skills of Proposal writing. Data management.

PIO 394: SEMINAR (2 Units)

Seminar topics will be assigned as may be determined by the department.

400 LEVEL

FIRST SEMESTER

PIO 431: ADVANCED CENTRAL NERVOUS SYSTEM (3 UNITS)

The human brain stem

Basal ganglia

Thalamus

Cerebellum

Cerebrospinal fluid and blood-brain barrier

Electrophysiology of cerebral cortex

Encephalogram

Alertness and sleep

Postural regulation and reflexes

Applied physiology of Central nervous system

PIO 433: HYPOTHALAMO-HYPOPHYSEAL SYSTEM PHYSIOLOGY (2 Units).

*Diagrammatic illustration of the relationship between the hypothalamus and the pituitary gland.

*Physiologic morphology of the hypothalamus and the pituitary gland (anterior and posterior pituitary).

*Development (embryology) of the hypothalamo pituitary axis.

*Histology of the hypothalamo-pituitary axis

Cell types of the anterior pituitary gland – functions, distribution and staining characteristics.

*Blood supply of the hypothalamo-pituitary axis.

Hypothalamo-hypophy seal portal system.

*Nervous pathways of the hypothalamo-hypophyseal axis.

Hypothalamo-hypophy seal nerve tract.

*Functions of the hypothalamus.

Hypothalamic neurohormones and their functions

*Hormones of the Posterior pituitary gland – site and mechanism of synthesis, transport, storage and release.

*Feedback mechanisms in the hypothalamo-hypophyseal system.

PIO 443: ADVANCED HUMAN NUTRITION (3 UNITS)

The course emphasizes basic nutritional science, diets and its adequacy

Food nutrients and their metabolism

Application of nutrition principles to the needs of infants, children, adolescents, pregnant and lactating women

Nutrient requirements in relation to physical activity and aging

Diet and diseases e.g. obesity

Under-nutrition

Starvation

PIO 472: ADVANCED ENDOCRINOLOGY (3 UNITS)

Further consideration of the synthesis, storage, release and functions of hormones

Electrophysiology of the posterior pituitary magnocellular neurons

Functions of median eminence

Role of kisspeptin in control of gonadotropins

Pituicytes function in hormonal control

Congenital and acquired abnormalities of the pituitary

Extraction and purification of hormones

Mechanisms as exemplified by vasopressin, thyroxine and gastrin

PIO 481: ENVIRONMENTAL PHYSIOLOGY (3 UNITS)

Comparative physiology of different mammals and non-mammals vertebrate species

Human and animal physiological responses and adaptation to extreme conditions of heat, cold, altitude, pressure and gravity

Effects of environmental pollution on physiological conditions

Global warming awareness and importance of Green House

Circadian rhythm and animal senses

PIO 483: PATHOPHYSIOLOGY (3 UNITS)

The course encompasses pathophysiology of major organs and systems.

PIO 491: RESEARCH METHOD IN PHYSIOLOGY (3 UNITS)

Handling of laboratory animals (including in vivo and in vitro preparations).

Animal house

International regulations/jurisprudence in experimental physiology

Choice of animals and/or isolated tissues

Introduction to laboratory methods and designs in physiological experimentation

Biological assay techniques

Interpretation and statistical analysis of results

**PIO 492: PHYSIOLOGICAL INSTRUMENTATION AND TECHNIQUES
(3 UNITS)**

An overview of biomedical instrumentation and application in medical science

Transducers and transduction

Bipotential and their applications

Experimental surgery

Assays

Ethics in biomedical research

Histological techniques

Animal handling and care

**PIO 494: LABORATORY PRACTICE IN CLINICAL PHYSIOLOGY
(3 UNITS)**

Laboratory demonstration of some routine diagnostic procedures in clinical physiology Recordings and interpretation of electrocardiogram

Interpretations of abnormal electrocardiogram, Recordings and interpretation of electromyogram

Interpretations of abnormal electromyogram Recordings and interpretations of electroencephalogram

Interpretations of abnormal electroencephalogram Assessment of pulmonary functions

Laboratory posting for eight weeks in chemical pathology, histopathology,

haematology and blood transfusion

PIO 496: PROJECT/ORAL DEFENCE

(6 UNITS)

Departmental internal seminar is conducted to assess the level of preparation of the students before the external examination. Scores are awarded in the internal seminar which shall be used as assessment to the project/thesis. This can only be agreed upon by the Department examination board committee

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	Percentage Score	Letter Grade	Points	Rating
1.	70% and above	A	5.0	EXCELLENT
2.	60 69	B	4.0	GOOD
3.	50 59	C	3.0	AVERAGE
4.	45 49	D	2.0	SATISFACTORY
5.	40 45	E	1.0	PASS
6.	0 39	F	0.0	FAIL

To determine the final grade a student receives in a course at the end of a semester, 30 % weight s given to a continuous assessment and 70 % to the semester examination. Examination can be graded over 100 % only when the student has met up to 75% attendance and did not write a

continuous assessment on a health ground and no assessment in terms of assignment, term paper or otherwise given prior to the examination.

THE CUMULATIVE GRADE POINT (CGPA)

- i. The Cumulative Grade Point Average (CGPA) is the measure of the student's overall academic performance at any given point in his/her programme.
- ii. CGPA is normally computed at the end of each semester as an up- to-date weighted mean of the grade points where the weights are the course credit units.
- iii. The grade points earned at all the end of semester examinations shall count towards the CGPA in (iv) below
- iv. $CGPA = \frac{\text{sum of all Quality Points}}{\text{sum of all credit units for all courses registered/repeated so far in the programme}}$
- v. The final CGPA calculated at the end of a student's academic programme shall determine the class of degree the student shall be awarded.
- vi. CGPA of at least 1.00 shall place student in good academic standing.
- vii. A student whose CGPA lies between 0.60 and 0.99 shall be placed on academic probation in the following session
- viii. Such a student in (vii) above shall re-register and repeat the failed courses and any other course subject to a maximum of 15 credits.