

BACHELOR OF SCIENCE IN PUBLIC HEALTH

1.0 INTRODUCTION

Public health is concerned with the protection, preservation and promotion of the health of communities and populations. Public health professionals therefore need to be appropriately trained to respond to the various community health problems. Through training and acquisition of relevant knowledge and skills in a multidisciplinary manner, public health professionals will understand how to identify and approach issues affecting populations, be able to develop appropriate strategies for resolving them, and monitor their implementation. The Bachelors degree in Public Health at the School of Health Sciences, thus provides opportunities for such training, as well as for research and public health practice.

2.0 OBJECTIVES

The general objective is to prepare students with a strong scientific foundation for continuation into advanced degrees as well as a grasp on community engagement.

The specific objectives of the programme are:

- a) Promote competence in practice in addressing issues in public health, notably disease control.
- b) Impart necessary skills applicable to the public health profession for local and international careers as managers and policy developers.
- c) Enhance the development of skills in scientific research and writing that will enable the trainees to work together with biomedical teams
- d) Equip trainees with skills essential in planning, managing and evaluating various public health programmes.

3.0 ADMISSION REQUIREMENTS

Candidates must satisfy the minimum entry requirements to University Senate of mean grade C+.

In addition they should meet the following requirements:

- a) Minimum grades of C in Biology, Chemistry and Mathematics in K.C.S.E or its equivalent.
- b) Holders of KACE with minimum of 2 principals and a credit in O-level.

- c) Holders of relevant diplomas from a recognized institution with credit and above.

4.0 CREDIT TRANSFER

- a) Transfer of academic credits shall be accepted on individual basis for courses undertaken and successfully completed by students at accredited universities/institutions who request to transfer the same to the University College for incorporation into the degree course and final classification of the degree.
- b) The relevant academic body as approved by the University Senate shall make official evaluation and transfer of credits.
- c) The number of hours, content and grading of courses for which credit transfer is sought should be similar to the courses offered at the University.
- d) Only a maximum of 1/3 or equivalent of the study programme at the University can be transferred.
- e) Such courses are to satisfy the requirements of the first and second years of study only.

5.0 COURSE STRUCTURE AND DURATION

The duration of the Public Health degree program shall normally be extended over a period of 4 academic years of 8 semesters. One semester shall comprise a minimum of 7 units and a maximum of 9 units.

The program course should comprise lectures, laboratory practical, field/industrial/attachment/tutorials as reflected in the course description.

The program is organized as follows:

All candidates must take all the core and required courses including field work, industrial attachment and research project.

Special exemptions may however be given where a candidate has taken equivalent courses elsewhere as may be the case with transfer students.

The program has a multidisciplinary nature and therefore borrows from other biological, physical and social science disciplines. The courses are offered in units, a unit is that part of a subject

described by a coherent syllabus and taught normally over a period of a semester. It is designated as a total of 42 hours of study in a semester. For this purpose one 1-hour lecture is equivalent to one 2-hour tutorial or one 3-hour practical or any combination of this as may be approved by the Board of the School of Health Sciences.

6.0 EXAMINATIONS REGULATIONS.

University Senate Examination rules and regulations shall apply.

7.0 COURSE DISTRIBUTION

YEAR ONE SEMESTER ONE

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3111	Introduction to Human Anatomy	28	14	42	1C
HCD 3112	HIV and AIDS	42	0	42	1C
HPD 3113	Principles of Public Health	28	14	42	1C
HPD 3114	Invertebrates of Medical and Veterinary importance	28	14	42	1C
SCH 3111	Inorganic Chemistry	28	14		1R
SMA 3111	Mathematics I	42	0	42	1C
SCS 3111	Computer Organization and Application	28	14	42	1 R
EEL 3115	Communication Skills	42	0	42	1R
	Total	266	70	336	8

YEAR ONE SEMESTER TWO:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HPD 3121	Medical Physiology	28	14	42	1C
HPD 3122	Waste Management	42	0	42	1C
HPD 3123	Medical Anthropology	42	0	42	1C

SCH 3121	Organic Chemistry	28	14	42	1C
SMA 3112	Mathematics II	42	0	42	1C
SCS 3124	Information, Technology and Society	28	14	42	1C
SLB 3121	Development Studies	42	0	42	1R
ERP 3121	Social Ethics and Integrity	42	0	42	1R
	Total	294	42	336	8

YEAR TWO SEMESTER ONE:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3211	Community Based Health Care I	42	0	42	1C
HCD 3212	Introductory Virology	42	0	42	1C
HCD 3213	Health Education and Promotion	42	0	42	1C
HCD 3214	Theories, Concepts and Trends in Health and Development	42	0	42	1C
HCD 3215	Environmental Health	42	0	42	1C
HCD 3216	Occupational Health and Safety	42	0	42	1C
SBI 3211	Basic Microbiology	28	14	42	1C
PSP 3214	Geographical Information System	28	14	42	1C
	Total	308	28	336	8

YEAR TWO SEMESTER TWO:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3221	Principles of Epidemiology	42	0	42	1C
HCD 3222	Health Policy and Administration	42	0	42	1C
HPD 3223	Disease Surveillance and Outbreak Investigation	42	0	42	1C
HCD 3224	Community Based Health Care II	42	0	42	1C
HCD 3225	Gender and Health	42	0	42	1C
HCD 3226	Medical Bacteriology	28	14	42	1C
HCD 3227	Medical Entomology	28	14	42	1C
HCD 3228	Medical Mycology	28	14	42	1C
	Total	294	42	336	8

YEAR THREE SEMESTER ONE:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3311	Epidemiology of Common Diseases	28	14	42	1C
HCD 3312	Health Communication and Information Systems	42	0	42	1C
HCD 3313	Health Economics and Financing	42	0	42	1C
HCD 3314	Community Based Health Education	42	0	42	1C
HCD 3315	Maternal and Child Health	42	0	42	1C
HPD 3311	Medical and Veterinary Parasitology	28	14	42	1C
HPD 3313	Application of GIS for Public Health	28	14	42	1C
BEP 3315	Entrepreneurship	42	0	42	1R
	Total	294	42	336	8

YEAR THREE SEMESTER TWO:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3321	Community Based Counseling	42	0	42	1C
HCD 3322	Health System Development and Management	42	0	42	1C
HCD 3323	Demography and Health	42	0	42	1C
HCD 3324	Community Water Supply and Sanitation	28	14	42	1C
HPD 3324	Basic Immunology	42	14	42	1C
HPD 3325	Human Ecology	42	0	42	1C
HPD 3327	Research Methods	28	14	42	1C
SBI 3326	Biostatistics I	28	14	42	1C
	Total	280	56	336	8

YEAR THREE SEMESTER THREE:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HPD 3331	Industrial Attachment		480	480	
	Total		480	480	

YEAR FOUR SEMESTER ONE:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3411	Preventive Medicine	42	0	42	1C
HCD 3412	Reproductive and Sexual Health	42	0	42	1C
HCD 3413	Control and Prevention of Communicable and Non-Communicable Diseases	28	14	42	1C

HPD 3411	Public Health Law and Conventions	42	0	42	1C
HPD 3412	Port Health	42	0	42	1C
HPD 3414	Project I	14	28	42	1C
HPD 3413	Land Development, Housing and Health	28	14	42	1C
HPD 3415	Biostatistics II	28	14	42	1C
	Total	266	56	336	8

YEAR FOUR SEMESTER TWO:

COURSE CODE	COURSE TITLE	Contact hours			Weight (Unit)
		Lecture	Practical	Total	
HCD 3421	Mental Health	42	0	42	1C
HCD 3422	Community Health and Nutrition	42	0	42	1C
HPD 3421	Food Technology and Hygiene	28	14	42	1C
PSP 3329	Project Monitoring and Evaluation	42	0	42	1C
HCD 3425	Environmental Toxicology and Health Care	42	0	42	1C
HPD 3422	Project II	14	28	42	1C
HPD 3423	Animal Pathology and Meat Inspection	28	14	42	1C
	Total	238	56	294	7

C: Core course, which is central to the discipline of study

R: Required course, which is supportive or beneficial to the programme

8.0 COURSE DESCRIPTION

8.1 YEAR ONE SEMESTER ONE:

HCD 3111: Introduction to Human Anatomy

42 Hours

Introduction to regional and surface anatomy of man; tissues and structures: skin, subcutaneous tissues, deep fascia, tendons, raphes, cartilage, muscle, bone, joint, mucous membranes, blood vessels, lymphatic and lymphoid tissues; nervous system: neurons and nerves, general principles of nerve supply, nerve supply to abdominal wall and limbs; segment innervations of skin and muscle; upper limb, lower limb, thorax, abdomen, head, neck, spine; osteology of the intact skull, skull bones and hyaloids bone; regional and surface anatomy in relation to medical imaging techniques for disease diagnosis and other purposes.

HCD 3112: HIV and AIDS

42 Hours

Introduction; historical background and magnitude of HIV and AIDS, general organization of the human body, reproduction, immune system and other factors; sex and sexuality; the biology of the human immunodeficiency virus and viral transmission; stages of infection and the development of HIV and AIDS; opportunistic infections; HIV and AIDS prevention and infection control; peer education for HIV; treatment options and vaccine development; blood transfusion and HIV and AIDS; management of HIV and related infections; legal and Ethical Issues in HIV and AIDS; Factors that influence the spread of HIV and AIDS in Africa; case studies in selected countries in Africa; HIV and AIDS as a national disaster impacts; myths and emerging issues on HIV and AIDS.

HPD 3113: Principles of Public Health

42 Hours

Definitions; origins and development of public health principles of public health; Theories and methods of disease control; major diseases threatening public health; poverty related health problems and health systems in low, middle and high income societies; actors and disciplines involved in public health; epidemiological measures of disease frequency and risk; preventive strategies; public health impacts; cultural aspects of public health. Definition and terms used in public health, history of public health, changing trends in public health, population structure,

individuals, families, communities and environment patterns, frequency and distribution of disease; roles of communities in prevention and control of communicable and non-communicable disease: disease surveillance, environmental health, water and sanitation, pollution control, nutrition, human behavior, changing lifestyles, community participation. Public health intervention: definition of terms in public health interventions, health promotion, nutrition immunization programmes, family health and family planning programmes, adolescent and youth programmes. Reproductive health programmes, environmental control, occupational health services for groups with special needs, refugees and internally displaced persons, urban planned, urban slums, human resource management, medical ethics, medical-legal matters, community health information systems.

HPD 3114: Invertebrates of medical and veterinary importance **42 Hours**

Introduction to Zoological nomenclature (ICZN) and classification of organisms. The course explores the invertebrates with emphasis on selected phyla of medical and veterinary importance: Protozoa, Platyhelminthes, Nematoda, Spiculida, Mollusca, Annelida, and Anthropoda; their classification, biology, external structure, locomotion, Nutrition, excretion, Nervous system, reproduction, embryology and economic importance.

SCH 3111: Inorganic Chemistry **42 Hours**

Atomic structure: Bohrs theory. Wave nature of electrons. Quantum mechanical model of the Atom. Quantum numbers. Orbital shapes and energy, Qualitative consideration of the Schrodinger wave equation in deduction of s, p, d, f orbitals. Electron spin and the Pauli's exclusion principle. Hund's rule. Aufbau. Principle and the Periodic table: Periodic trends in atomic properties. Electronegativity, electron affinity and atomic radius. Octet rule. Chemical bonding: Ionic bond, Covalence, Co-ordinate valency, Valence-bond representation, Dipole-dipole interactions. Intermolecular forces. Intra-molecular forces, Van der-Waals radii, Hydrogen bonding. Valence Shell Electron Pair Repulsion (VSEPR) theory. Shapes of molecules. Multiple bond repulsion. Hybrid orbitals. Shapes of alkanes, alkenes and alkyne molecules. Sigma and Pi- bonds. Simple MO bonding.

SMA 3111: Mathematics I **42 Hours**

Elementary set theory. Mappings and functions: Definitions, domains, codomains, range and inverses and composition of functions. Trigonometry: Functions, their graphs, inverses, degree and radian measure, sine and cosine formulae, trigonometric identities and equations. Algebra: Quadratic equations. Surds, logarithms and indices. Series: Arithmetic and geometric progressions, Permutation and combinations. Binomial theorem and applications such as approximations, simple and compound interest. Remainder theorem applications to solutions of factorials polynomials. Statistics: Collection and representation of data. Measures of central tendencies and variability. Graphical and axiomatic approaches to probabilities. Tree diagrams. Probability: Definition, axioms, tree diagram.

SCS 3111: Computer Organization and Application 42 Hours

Organization: Introduction to the computer and the notion of a programmable machine. The basic organization based on the von Neumann model. Functional components (CPU, memory, I/O) and their logical organization. Number systems and internal data representation. Concept software and types of software. Components of contemporary personal computer systems from end-user perspective. Application: Classical and contemporary applications of computers. Proficiency in basic computer usage and productivity/office automation applications including word-processing, spreadsheets, e-mail, web, etc. Basic first level security and maintenance issues. Ethical and societal issues.

EEL 3115: Communication Skills 42 Hours

Study skills; planning study time, making references, filing notes; preparing for examinations. Library Skills: organization; classification, shelving; using reference books, listening in lectures, speeches and instructions, understanding lectures, note taking, speaking skills, asking and answering questions in lectures and seminars, making and defending arguments, agreeing and disagreeing, explaining points clearly, academic reading skills, skimming and scanning, understanding footnotes and bibliographical references.

YEAR ONE SEMESTER TWO:

HCD 3121: Medical Physiology 42 Hours

Central nervous system: spinal reflexes, sense organs, autonomic nervous system; water and osmotic regulations; Renal function; digestive and associated glands; food and energy; neuroendocrine control of physiological processes; Principle of neurology and fundamentals of brain structure in relation to behaviour patterns and sensory organs; Neurotransmission and neuronal networks; Reproductive and exercise physiology; physiological base of aging process; approaches in measurement of physiological parameters in man in health and disease: blood volume, cardiac output, total peripheral resistance, blood pressure, lung function and renal function etc including description of equipment and medical devices used for such measurements.

HPD 3122: Waste Management

42 Hours

The basic knowledge of solid and liquid wastes and their management in public health will be covered. Topics covered include: public health aspects of solid wastes, solid waste management, disposal methods in urban and rural areas, disposal of corpses and dead animals, public health transmissions, design and construction of excreta disposal methods disposal of liquid wastes, industrial liquid wastes, the processes in sewage treatment and its management, stream pollution, and natural purifications. The course also includes: wastewater treatment and wastewater parameters; River pollution control; Preliminary and primary treatment; Activated sludge; percolating filters; waste stabilization ponds; aeration theory, removal kinetics; waste water treatment for small communities; industrial wastewater treatment; anaerobic treatment; sea outfalls and tertiary treatment; and sludge treatment and disposal.

HPD 3123: Medical Anthropology**42 Hours**

Definition, its development and relationship to other disciplines; Definition of health and disease; Social and cultural and factors affecting the cause, incidence and severity of disease; Innovation and change in ethno-medical beliefs and practices; African ethno medicine; witchcraft, sorcery, magic and traditional medicine, medical paraphernalia, their cultural setting and therapeutically effectiveness; cultural training and medical personnel; health promotion strategies; Institutions/ settings; interactions and relationship between biological aspects of behaviour; Social and cultural beliefs and practices and environment; emerging and re-emerging infectious diseases: Malaria, HIV/AIDS, Tuberculosis, cholera, Ebola etc.

SCH 3112: Organic Chemistry**42 Hours**

The uniqueness of carbon in the periodic table and catenation. Bonding in carbon compounds including sp , sp^2 , sp^3 , hybridization. Elementary structural elucidation, calculations of empirical and molecular formulae, double bond equivalents. The occurrence, nomenclature, structural isomerism, physical and chemical properties of alkanes, cycloalkanes, alkenes, alkynes. Alkyl halides, alcohols, carbonyl compounds, carboxylic acids, alkyl amines. Reaction mechanisms: Substitution, elimination.

SMA 3112: Mathematics II**42 Hours**

Coordinate geometry and equations of straight lines. Matrices: definitions, matrix algebra, determinants, transpose, adjoints, inverses and solutions of systems of linear equations using matrix method. Limits, continuity. Differentiation and integration of algebraic, trigonometric, exponential functions. Applications of differentiation and integration to rates of change, maxima, minima. Area under curve. 1st order D.E and their application.

SCS 3124: Information Technology and Society**42 Hours**

Introduction to the basic concepts and applications of computer and Internet-related information technology and its impacts on individual users, businesses, groups, organizations, and society. Topics include access, evaluation, and use of digital information, ethical and security implications of information use and storage; human-computer interactions; social aspects of information systems; economic and legal issues; Ethical use and dissemination of health

information, and professional presentation and communication of information. Information literacy skills that promote lifelong learning are developed through exposure to various existing and emerging technologies, including information resources, communication methods and technology.

SLB 3121: Development Studies 42 Hours

Development studies as an autonomous discipline; the concept of development; an overview of the theories and paradigms of development; the relationship between economic growth and development; science and technology in development; developed and developing countries; issues in development: Social, economic and political; actors in development: The state, national and international NGO's, bilateral and multilateral institutions, multinational corporations (MNC's) and social movements.

ERP 3121: Social Ethics and Integrity 42 Hours

Definitions and concepts; categories of ethics; national cohesion; integrity; unity; structural injustices; ethnicity: positive ethnicity, negative ethnicity; peace: peace making, peace building, peace transformation; stake holders in national cohesion.

YEAR TWO SEMESTER ONE:

HCD 3211: Community Based Health Care I 42 Hours

Meaning, nature and role of community participation/involvement in health service provision; critical and /or catastrophic illness, HIV and AIDS, cancer, support mechanism for community involvement in health care; positive living with terminal illness; the concept of home-based care and support; self care for people with terminal illness; assessing learning needs for home-based care givers and patients; participatory monitoring and evaluation for home-based care; Voluntary Counseling and Testing(VCT); preparation for test results; breaking bad news and giving factual information; client reaction; post-test counseling; patient information and education; behavior change; Prevention of Mother to Child Transmission of HIV(PMTCT); Antiretroviral Therapy in HIV.

HCD 3212: Introductory Virology 42 Hours

Virus structure and architecture; Classification and nomenclature of viruses: DNA,RNA viruses and bacteriophages; Viral genetics and replication processes; Viral infections: epidemiology, prevention and control; Infection processes and interaction of viral particles with host cells; Viroids, prions and chronic debilitating diseases of undermined etiology; Techniques used for propagation, assays, identification and characterization of Viruses; Current trends in antiviral chemotherapy.

HCD 3213: Health Education and Promotion

42 Hours

Health promotion in the context of community health, The sociology of health promotion, The psychology of health promotion, Theories and models of health promotion, Health promotion strategy and policy formation, Equity and health promotion, Qualitative needs assessment and participatory research, Community and organisation development, Health promotion in action, Health promotion planning, research and evaluation, The role of health impact assessment in health promotion, Evaluation and skills inventory.

HCD 3214: Theories, Concepts and Trends in Health and Development 42 Hours

Definition of health, development and sustainable development; relationship between health and development. Definition of well being, standard of living and dignified livelihood. Factors affecting health status and healthcare; health sector reform, role of civil society in health development, poverty and health, policies in health and development. Donor relationships, trends and conditionality.

HCD 3215: Environmental Health

42 Hours

Environmental pollutant system and definition of poisons, drugs and toxins and principle of environmental epidemiology and clinical ecology, inorganics, organics, photochemical oxidants, pesticides, insecticides, nicotinoids, retinoids, fungicides rodenticides, acaricides, herbicides and radioactive materials; risk and hazards includes health risks chronic and lethal effects and impacts on ecosystem, toxicokinetics: half life and disappearance rates; relationship between dose and effects; breakdown and metabolism; environmental partitioning, transport and distribution in natural system. Routes of exposure and accumulation in organism and elimination in human and environment; Nutrient retention and transfer, techniques currently used in

assessment of environmental health and toxicology including quantitative, qualitative, molecular chemical, biochemical and biological test and assay for impact assessment; Principle of toxic waste management, environmental health; toxicology, and the law.

HCD 3216: Occupational Health and Safety

42 Hours

Studies on environmental and work hazards, their interactions with human health and their relevance to the effective maintenance and promotion of public health. Principles of occupational health, hazard and accidents. Risk assessment, human susceptibility and interaction with occupational and environmental exposures, housing and human health accident control and safety management policies and legislation.

SBI 3211: Basic Microbiology

42 Hours

Introduction to the science of microbiology; brief descriptions of nature and types of micro-organisms; prokaryotic and eukaryotic micro-organisms, introduction to bacteria, fungi, protozoa and viruses. Isolation, culture, staining microscopic examination techniques Sterilization methods, identification and classification of selected microbial groups e.g. bacteria and fungi. Microbial growth and nutrition. The effects of environmental factors on microbial growth and survival. Ecological relationships of microorganisms. The structure and replication of bacteriophage. Control of micro-organisms and chemotherapeutic agents.

PSP 3214: Geographical Information System

42 Hours

Analysis of digital geographic information using modern spatial data processing. Types include conceptual models of geographic data, database development, integration of remote sensing with GIS, elementary spatial analysis and functions and applications of geographic information systems. Types of simulation. Building simulation models, Conceptual models, Diagrammatic models. Statistical models GIS data integration and modeling; Vector data and its uses. Raster data and its uses. Modeling processes, Spatial models, Building models using GIS, Digital elevation models, Field data validation of models Limitation of models.

YEAR TWO SEMESTER TWO:

HPD 3221: Principles of Epidemiology**42 Hours**

Concepts, and principle of public health and epidemiology; Epidemiological approaches Descriptive epidemiology, analytical epidemiology; concepts of disease and health in human communities; patterns of occurrence and determinants of communicable and communicable disease in human population; measurements of disease frequency and association; samples and surveys; records and registers; epidemiological type of infectious disease and epidemics including emerging and reemerging infectious; experimental epidemiology; epidemiological data and their interpretation and statistics; principles of molecular epidemiology and their applications and disease control; modeling and development of predictive parameters as indices for disease outbreak and computer application including health information; concepts of control of communicable and Non communicable diseases; Screening, prevention and immunization, treatment Including control of hospital acquired infections and pharmaco-epidemiology; Integrated approaches of disease control as public health procedures

HPD 3222: Health Policy and Administration**42 Hours**

Different theoretical approaches and concepts used in policy analysis. The political system within which policies are made and the contextual factors that lead to policy change; the different arenas involved in health policy, the actors within these arenas, and the key features of processes of policy identification, formulation, and implementation; how to use in research and/or decision-making policy analysis framework introduced during the module.

HPD 3223: Disease Surveillance and Outbreak Investigation 42 Hours

Disease surveillance: Definition; Passive and Active surveillance. Uses of surveillance system: identification health needs, epidemics, fields of research, and measuring the impact of a program. Sources of surveillance data: Hospital records, outpatient facilities and surveys. Methods and strategies: Case definition, Data registration, declaration, transfer and analysis of data, and feedback. Strategies: Exhaustive, disease-selective and service-selective. Disease outbreaks: Definitions; Endemic, epidemic, types of epidemics, pandemic, holoendemic, and hyper endemic. Measurements: Primary and secondary attack rates, case reproduction rate, Epidemic curves, single versus multiple exposure, secondary source, incubation period. Management and control: Purpose of investigation, preliminary investigation, identification of cases, collection and analysis of data, implementation of control measures, dissemination of findings and follow-up. Specific epidemics: Meningitis, Measles, Malaria, Food poisoning, Nosocomial and Zoonotic infections.

HCD 3224: Community Based Health Care II 42 Hours

Analysis of local resources, nutrition surveys and other factors affecting development in various communities. Programme design and implementation for selected communities. The technical and public health issues of Reproductive Health; Fundamentals of Pregnancy, Contraception, Abortion. Sexually transmitted diseases; nutritional determinants of health and disease; Family planning and maternity care; family centered community based health care; primary problems of children and adolescents; issues in human lactation and breastfeeding promotion; Growth and development; Prenatal and School age childhood; infants at risk and children with disabilities; Maternal Child Health (MCH) programmes and policies; control of non-communicable diseases.

HPD 3225: Gender and Health 42 Hours

Social and cultural constructions of gender and effect on health outcomes via influences at individual, household, community and health service level; important differentials in mortality and morbidity profiles of men and women in developing and developed country settings; description of the multiple gender-health linkages for at least one major health outcome (options will include: HIV/AIDS, TB, CVD, depression, and lung cancer); importance of integrating gender concerns when: analysing the magnitude and causes of different health problems;

determining priorities for health investment; developing policies for health promotion; and designing and evaluating health interventions; familiarity with some of the gender-analysis tools for healthcare planning and evaluation; existence of divergent policy/programme approaches to addressing sex differentials, and gender influences, in health and controversy surrounding these issues.

HPD 3226: Medical Bacteriology

42 Hours

Classification and characteristics of pathogenic bacteria; occurrence, morphology, physiology, growth requirements cultural characteristics, antigenic structure, immunology, diagnosis, chemotherapy and immunity of pathogenic bacteria infection processes, attachment and interaction of bacteria to host tissues: surface molecules, toxins and other virulence factor including molecular and genetic bases of bacterial pathogenicity; agents for control of pathogenic bacterial infections: bacteriostatic and bactericidal substances, modes of actions and spectrum of activity; methods of identification of pathogenic bacteria; prevention and control of bacterial infections.

HPD 3227: Medical Entomology

42 Hours

Introduction to arthropod biology and vector sciences and the concept of host of disease causing organism, distribution, anatomy, physiology, life circle, medical and economical importance of arthropods; Identification, recording, labeling and preservation of arthropods and other vector of medical importance. Control of insects and other arthropods that serve as vectors of disease-causing organism and those that cause tissue damage in man including relevant pathological factors; Emphasis on mosquitoes, tsetse flies, culicoides, acarines, fleas, lice, bedbugs, etc; Phlebotomus, myiasis causing flies, tabanides, similium; Non arthropod disease vectors including snails and crustacean organism.

HPD 3228: Medical Mycology**42 Hours**

Characteristics and classifications of medically important fungi. Diseases caused by fungi: Dermatophytes, Yeast infections: Candidiasis, Cryptococcosis. Pulmonary mycoses: Coccidioidomycosis, Histoplasmosis, Blastomycosis, Paracoccidioidomycosis. Inoculation mycosis: Sporotrichosis, Chromoblastomycosis, Mycetoma. Opportunistic fungus diseases: Aspergillosis, Zygomycosis.

YEAR THREE SEMESTERS ONE:**HCD 3311: Epidemiology of Common Diseases****42 Hours**

Epidemiology of HIV infection and AIDS, transmission and status of infection in different age group population with reference to Kenya and the great lakes region; screening, surveillance, counseling and programme evaluation; emergence of tuberculosis and its association with HIV/AIDS, investigation of outbreak and drug resistance; causes and natural history of cancer; geographical distribution; cancer screening in public health; epidemiology of malaria and episodes of vector population increases; predictive indices for disease outbreaks

HCD 3312: Health Communication and Information Systems**42 Hours**

Definitions of communication and information systems; print electronic and folk media; health belief model; risk relationships and social community-based health information ,education and communication systems; changing social norms, attitudes and values; the role of mass media in behavior change communication and disease prevention; evaluating health promotion and communication materials and programs; content, audience, channel, reach, frequency; producing health communication and promotional materials; analyzing the situation and setting program objectives, segmenting audience, determining the message, determining the channels of communication, implementing plan; building networks of support through social mobilization, social marketing and media advocacy; measuring success

HCD 3313: Health Economics and Financing**42 Hours**

Concepts, impacts of a healthy population in an economy. Effect of health-care on health and the role of insurance. Demand and supply of health care. Behaviour of the physician. General market organization of the health industry. Examples of health financing in specific countries such as UK, USA, Kenya

HCD 3314: Community Based Health Education**42 Hours**

The concept and principles of community based education, learning needs assessment, curriculum development, implementing and evaluating a training program, lesson planning and presentation, development and use of learning aids, adult education.

HCD 3315: Maternal and Child Health**42 Hours**

Historical roots and contemporary structure of maternal and child health services. Major health problems of mothers and children and their key determinants. Programmatic and policy interventions developed to address the major health problems of mothers and children

HPD 3312: Medical and Veterinary Parasitology**42 Hours**

Ecological and epidemiological concepts: symbiosis, mutualism, commensalisms and parasitism (endo-, ecto-, obligate, facultative, accidental, temporary, hyper). Evolution of parasitism. Morphology and life cycle of some phyla: Protozoa – Amoeba (*Entamoeba histolytica*), Flagellates (*Giardia*, *Trypanosoma*), Sporozoa (Coccidia; *Plasmodium*, *Eimeria*, *Toxoplasma*), Platyhelminthes and Aschelminthes: Trematodes (*Fasciola*, *Schistosoma*), Cestoda (*Taenia*, *Echinococcus*), Aschelminthes/Nematodes (intestinal, blood and tissues types). Zoonotic diseases. Arthropods: Arachnids (ticks, mites), Insects (lice, fleas, bugs, flies, myiasis, parasitic hymenoptera), Crustaceans (copepods). Epidemiology, diagnosis, pathogenesis, immunology, treatment and control of the diseases caused by the parasites mentioned above.

HPD 3313: Application of GIS for Public Health**42 Hours**

Health Information and Decision Support Systems: the fundamentals of information systems development and management: Health Data Standards, Laboratory Information Systems, Electronic Health Records, Health Alerts and Monitoring Systems, Disease Registries, Health Information Exchanges, National Electronic Disease Surveillance System and Public Health

Information Network. Environmental Database Design and Analysis: The design and analysis of relational and spatial environmental health databases. The fundamental principles of sound database design from the viewpoint of a database design architect. Geographical Information System Application in Public Health: The major practices and techniques associated with GIS in the many application areas found in public health. Commonly used software, ArcGIS and its practical use in GIS- related sources and databases. Geographical Information Systems Integrative Project: Integration of the course material with the practical application of GIS technique to a project and its use by public health agencies.

BEP 3315: Entrepreneurship

42 Hours

Definition of Small and Medium Enterprise (SME); Theory and philosophy of entrepreneurship; Production efficiency, factor resource intensity, large vs. small enterprises, and justification for small enterprises; Understanding entrepreneurship: Starting a SME, creating and managing the venture; Sources of capital in venture creation; Consumer-entrepreneur relationship: role of product quality, innovation and skill in product quality; Marketing of SME product; Competitiveness; Scaling up; institutional arrangements; standards and quality; Barriers to SME development; role of SME in economic development; Case studies of successful SME: Indicators, vertical integration.

YEAR THREE SEMESTER TWO:

HCD 3321: Community Based Counseling

42 Hours

Overview of the principles and practice of guidance and counseling; basics of counseling in different situations e.g. group counseling, pre-test and pre-surgery counseling, and counseling people with HIV/AIDs and other diseases and disorders, the principles of psychotherapy and determination of psychosomatic conditions. Goals of counseling and guidance. Skills in counseling.

HCD 3322: Health System Development and Management

42 Hours

History of personal health services and Public Health, Health service systems: Methods of organizing and funding health services and their relative merits, Approaches to the assessment of needs for health care services, Evaluation of health services and strategies to maintain quality (including clinical governance, audit), Models and Organizational theory, Management theory, Management of change, Leadership, motivational theory, professional behavioral change, Negotiation and conflict management, Planning theory

HCD 3323: Demography and Health

42 Hours

Techniques used in demographic analysis for the measurement of fertility, mortality, and population structure and change, including migration in human populations; steps in interpreting basic demographic data; usefulness of a demographic approach for the study of population and health issues; how different types of demographic information may be collected.

HCD 3324: Community Water Supply and Sanitation

42 Hours

Sources of water; the nature of water; health issue related to water; diseases and condition related to water; water handling practices in various communities; water pollution and impurities in water; methods of water treatment and use ; the importance of sanitation; sanitation related diseases; methods of human waste and refuse disposal; socio-cultural factors that influence sanitation practices; socio-cultural/economic predisposal factor to health problems to various communities; methods of initiating a health education (sanitation) programme, sanitation related health problem; the concept of septic tank; the use of water borne sewerage as a sanitation option;

HPD 3311: Basic Immunology

42 Hours

Organization of the immune system: haemopoiesis and organization of cells; primary and secondary lymphoid organs; B and T cell ontogeny. Antigenicity and immunogenicity: antigens; haptens and carriers; microbial and parasite antigens; alloantigens. Classification and major features of immune responses. Humoral and cellular immune mechanisms: Complement system. Functions of B cells: mechanisms of activation; structures and functions of immunoglobulins: detection and measurement tests of Igs. Cellular mechanisms. T cells, T cell receptor: Major Histocompatibility Complex; T cell activation; role of microphages; cytokines; regulatory and

effector T cell functions. Protective immune mechanism against microbes: Host-parasite interactions. Complement mediated mechanisms. Antibody dependant mechanisms: neutralization; inhibition of epithelial attachment; phagocytosis; ADCC. Cellular mechanisms: DTH, Th 1 and Th 2 responses; cytotoxic T lymphocytes; NK and macrophage activity. Immune evasion mechanism by microbes. Immune-mediated disorders: allergic and hypersensitivity reactions; autoimmune and immunodeficiency disorders. Vaccination and immunization: type of vaccines, vaccine production, monitoring of vaccine efficacy and adverse effects. Kenya Expanded programme of immunization (KEPI) schedules.

HPD 3324: Human Ecology

42 Hours

Ecosystem: habitat, population, community. Components: biotic and abiotic. Relationships: Energy flow and nutrient cycles. The evolutionary trend of selection, succession, climax, population dynamics. Ecological genetics: importance and consequences of reproduction. Human activities: characteristics of diversity, stability and resilience that determine ecosystem ability to withstand human intrusion: agricultural; industrial, domestic; transportation. Effects of such pollutants as sulphur dioxide, acid precipitation, oil spills, agricultural chemicals and their effects on both terrestrial and aquatic ecosystems. Toxicity of pollutants, their dispersal and food chain aspects. Prevention: indicator organisms and biomonitoring techniques; equipment, terrestrial and aquatic species ; pretreatment; recycling; conservation; legislation.

HPD 3327: Research Methods

42 Hours

Philosophical aspect of scientific research and innovation and the methods and nature of science, including their application in biological science; preliminary review of state of scientific knowledge and literature survey of sample topics in biological science; different types of biological studies: Cross-sectional, vertical or prospective and follow up, retrospective cohort, time-series, case-report, case-series, case-control, controlled exposure, monitoring and surveillance. Research proposal formulation including generation of hypotheses, study objectives and laying out research plans and questionnaires; Resources required: personnel, budgeting and seeking for research funds support and collaboration; units of measurements and scientific calculation used in biomedical research and practice. Data analysis, interpretation, reporting, publication and references. Seminar presentation and analysis.

SBI 3326: Biostatistics I**42 Hours**

Introduction to Basic concepts; notation, tables and charts and Organization of Data. Measures of location: Mean Median, Mode and Percentile for grouped and ungrouped data and Graphical estimation. Measures of dispersion: ranges, mean, deviation, variance and standard deviation skew ness and kurtosis. Probability, probability distributions, random variables and the normal distribution.

YEAR THREE SEMESTER THREE**HPD 3331: Industrial Attachment****480 Hours**

Students will be attached to biological science based research institutions for a period of 12-14 weeks (between the end of year 3 and beginning of year 4) in line with their chosen options for year 4; during the industrial attachment students will be expected to acquire first hand impressions and experience of practical activities through personal participation and involvement; academic member/s of staff will visit each student at their place of attachment at least twice for on-the-spot evaluation; each student will submit their report within the first 30 days of the 4th year semester one.

YEAR FOUR SEMESTER ONE:**HCD 3411: Preventive Medicine****42 Hours**

Development and testing of vaccines; administration of immunization; formulation of vaccine policy; strategies for prevention of nutritional diseases; community based control of vector borne diseases; biological and socio-cultural determinants of nutritional status; behavioral approaches to interrupt disease transmission; management of large vaccine trials; travel medicine, immigrant health and emergency medicine.

HCD 3412: Reproductive and Sexual Health**42 Hours**

Review of reproductive system, introduction to sexuality, contraception, pregnancy, abortion and reproductive sexual health; screening and diagnosis of reproductive diseases; structural and functional basis of infertility, Ethical aspect of infertility and associated reproduction, Sexually

transmitted disease and their control; sex awareness HIV/AIDS; Community health education for prevention of HIV/AIDS and other sexually transmitted diseases

HCD 3413: Control and Prevention of Communicable and Non-Communicable Diseases

42 Hours

An overview of communicable and non-communicable diseases; life cycles of specific infections: leishmaniasis, filariasis, trypanosomiasis. Transmission and control; groups and types; transmission and control of bacteria and rickettsial-salmonellosis, cholera, plague and pneumonia. Control strategies; pathogen and epidemiological aspects of viral infections in man and their control strategies; influenza, yellow fever, hepatitis, measles and poliomyelitis. Zoonotic infections of public health importance; investigations and control. Skin and eye infections; diagnosis, treatment, control significance to the health community. Communicable diseases immunology; host and agents immune reaction mechanism. Emerging and re-emerging diseases; hemorrhagic fevers. The economic, social, policy and epidemiological aspects of disease control.

HPD 3411: Public Health Law and Conventions

42 Hours

Terms and History: relevant terms; Actus reus, prosecution, Nolle prosequi, Interparte, Exparte, Warrant of arrest, Charge, Charge sheet, Injunction, Evidence Nuisance. Historical development of public health laws. Sources of law: Constitution Kenya, Acts of parliament, Case Laws, Common Law, By-Laws, Professional ethics, International treaties and conventions. Criminal law: Characteristics of criminal law; Criminal procedure code; Penal code, Evidence Act and its application in relation to health law. Investigation and persecution procedures. Statutory powers and authority. Moot Court. Visit court of law to familiarize with prosecution process. Public Health Laws: Public health laws including provision of, content and requirement of public health Act, Food Drug and Chemical Substances Act, Mental Health Act, Meat control Act, Building code, Malaria prevention Act, Water Act, Hotels and restaurant Act Pharmacy and poisons Act. Physical Planning Act, Environmental Management and coordination Act. Workmen Compensation Act, Maritime Pollution laws and international Health Regulation.

HPD 3412: Port Health

42 Hours

Clearing procedures: Relevant port health laws and regulations. Passenger handling; health clearance and certification. International notifiable diseases. Quarantining and surveillance, disinfection and disinfestation of passengers and vessels. Sanitary condition of sea, air and land vessels: Water supply; waste collection and disposal; pests, vectors and rodent control. Frontier health. Sanitary requirements: Port environmental sanitation. Maritime pollution laws. International sanitary regulations. Crew and passenger catering hygiene; Health Education. Design, construction and sanitary operation of port kitchens and ancilliary equipment. Conditions of storage and handling of off-shore, prepared, prepacked meals, deep frozen and freeze dried foods. Container systems: Method of inspection and sampling. International Maritime Dangerous Goods Codes, Local and International Public Health legal requirements on land, air and sea transport. Port health activities: Educational trip to international airport, sea port and frontier town. Familiarise with the activities and write a report.

HPD 3413: Land Development, Housing and Health

42 Hours

Building materials. Deformation. Expansion and deterioration. Appearance. Soil and Soil mechanics. Manufacture. Production of concrete, conversion of timber, seasoning and treatment. Environmental effects: fungal decay, insect attack, rusting of metals, chemical attack and weathering. Standards for building materials: building code. Health and Safety requirements. Building construction: Drawing of projects. Quantity Surveying: Types of contracts. Laws of contracts. History of urbanization. Dynamics of development. Rural to urban migration. Economic and social status in relation to physical planning policies. Urban health. Planning and development for the control of rural and urban land. Regional development programme; settlements. Planning, zoning, land surveying, cartography, computer aided planning. Gathering, storing and utilizing information. Land development and settlement laws.

HPD 3414: Project I

42 Hours

Project will be captured in a thesis that will be a detailed written report on a research carried out independently by individual students over a period of two semesters. Project titles are selected with reference to the research interest and capabilities of staff. Main objectives – use of literature, learning of research techniques, an appreciation of the public health problems and their solution - devising appropriate experiments and/or planning sets of interventions, requiring

careful observation, data collection, analysis, discussion and drawing of appropriate conclusions. Projects should preferably be professionally relevant and demand-driven to enhance individual employment prospects. This first aspect will dwell on the objectives of the proposed project, literature review and materials and methods.

HPD 3415: Biostatistics II

42 Hours

Central ideas of estimation, confidence intervals and hypothesis tests. To perform sensible statistical analyses using the computer package SPSS and to report the results of analysis effectively. Large sample estimation; large sample tests of hypothesis; small sample tests. Hypothesis tests (including test of association for tables). Experimental design and Analysis of Variance. Regression and Correlation. Multiple regression. Discrete distributions. Tackling non-standard problems (including data transformations). Overview and tips on writing statistical analyses.

YEAR FOUR SEMESTER TWO:

HCD 3421: Mental Health

42 Hours

Classification of major mental disorders. Evidence on aetiology and treatment of mental disorder; public health significance of mental illness; application of epidemiological research methods to the study of mental health; influence of historical, cultural, socio-economic, and discrimination on mental illness and mental health service delivery; how mental health policies are made; how mental health issues are related to and can be integrated with public health priorities, such as reproductive health, conflict and primary health care.

HCD 3422: Community Health and Nutrition

42 Hours

Basic principles of nutrition and their role in community health. Diet, nutrition and health; Nutrition and metabolism: the basic chemistry of food, the cell and body composition, the digestion, absorption and assimilation of nutrients within the body; Major metabolic pathways and patterns of fuel consumption; Energetic and biochemical concepts that underpin nutritional recommendations; Physiological need for vitamins; Changes in human dietary patterns and the origins of unhealthy eating in society; Dietary factors that relate to diseases and their dietary

management; Derivation and interpretation of population based. Quantitative nutrient goals and strategies for prevention of dietary related diseases by population based dietary changes; Anthropometric measurements in assessing and storage; Nutritional status of individuals in a population; Quality control and food hygiene, sanitation, and storage Nutrition interventions in emergency situations; Maternal and child nutrition Etiology, pathophysiology, management and functional consequences of nutrition and management of severely malnourished and obese individuals

PSP 3329: Project Monitoring and Evaluation

42 Hours

introduction to Project Management Cycle (PMC); Introduction Project monitoring tools; introduction project evaluation tools; reviews of schedules, adding data; comparisons; checking progress; fine tuning; sub-projects; data search; producing reports; with other productivity tools; Computer applications in project monitoring and evaluation; Participatory monitoring and evaluation (PME); Performance Contracting in Kenya.

HCD 3425: Environmental Toxicology and Health Care **42 Hours**

Chemical and biochemical principles governing toxicity of environmental pollutants; route of entry, absorption metabolism, excretion, cellular action, host susceptibility ,responses, waterborne pathogens as contaminants in drinking water; water as habitat for arthropod vectors of diseases; contamination of water sources and habitats of diseases of water catchment areas; water sanitation and strategies in prevention of waterborne diseases; water hyacinth as a health problem; food safety ;food borne infections and intoxications.

HPD 3421: Food Technology and Hygiene **42 Hours**

Principles of food production and technologies, storage and distribution; chemical and physical properties of foods and food additives; Handling, preparation, preservation and sanitation of food; Role of food taboos in ensuring food hygiene and public health; Food borne infections and their etiological agents including viral, bacterial, fungal and parasitic agents: food analysis and toxicology: Water supply and water borne infections; Contamination of water supply and sewerage; Bacteriological analysis of water; Chlorine treatment of water; Public health aspects of food, production plants and other public utilities; Zoonotic diseases associated with food technology and hygiene; Legal aspects of food technology and hygiene.

HPD 3422: Project II **42 Hours**

Project will be captured in a thesis that will be a detailed written report on a research carried out independently by individual students over a period of two semesters. Project titles are selected with reference to the research interest and capabilities of staff. Main objectives – use of literature, learning of research techniques, an appreciation of the nature of biological problems and their solution - devising appropriate experiments and/or planning sets of interventions, requiring careful observation, data collection, analysis, discussion and drawing of appropriate conclusions. Projects should preferably be professionally relevant and demand-driven to enhance individual employment prospects. The report should be submitted two weeks before the end of the semester.

HPD 3423: Animal Pathology and Meat Inspection **42 Hours**

Introduction, scope and concepts. Pre-slaughter handling of food animals. Purpose of ante-mortem inspection. Slaughtering process. Slaughter house facilities. Purpose of postmortem inspection. Pathological and physiological conditions. Sampling procedure. Poultry: Slaughtering, inspection; diseases; and conditions. Principles of preservation of meat. Methods of slaughtering game. Inspection of game carcasses, judgments and disposal.