



HARVEST UNIVERSITY

SCHOOL OF HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

CURRICULUM  
FOR

DIPLOMA IN ENVIRONMENTAL HEALTH SCIENCES

***This is a National Curriculum designed for Higher Educational Institutions involved in Training Environmental Health Technologists in the Health Sector and was developed by Chainama College of Health Sciences and Evelyn Hone College of Applied Arts and Commerce under the Supervision of Department of Medical Education, University of Zambia***

HARVEST UNIVERSITY  
The Kingdom. The Power. The Glory

JANUARY 2018

## TABLE OF CONTENTS

1.0 INTRODUCTION .....	3
2.0 PROGRAMME MISSION STATEMENT AND VISION .....	3
3.0 INSTITUTIONAL VALUES.....	4
4. ENTRY REQUIREMENTS .....	4
5. PROGRESSION CRITERIA .....	5
8. CURRICULUM STRUCTURE.....	9
10. CURRICULUM MAP .....	11
12. PROGRAMME OBJECTIVES .....	16
13. PROGRAMME LEARNING OUTCOMES.....	16
14. COURSE CONTENT .....	18
14.1. FIRST YEAR FIRST SEMESTER COURSES .....	18
14.2. FIRST YEAR SECOND SEMESTER COURSES.....	44
13.3. SECOND YEAR FIRST SEMESTER COURSES.....	73
14.4. SECOND YEAR SECOND SEMESTER COURSES.....	103
14.5. THIRD YEAR FIRST SEMESTER COURSES .....	132
14.6. THIRD YEAR SECOND SEMESTER COURSES .....	165

## **1.0 INTRODUCTION**

The Environmental Health programme prepares graduates to work at any health and/or private institution to promote the general improvement of environmental health standards and health status of the general public in Zambia.

Environmental health is one of the most important elements of health promotion in Zambia. The maintenance and sustainability of an environmentally friendly nation can go a long way in preventing and reducing diseases that are associated with environmental factors.

From time to time, new trends occur in the area of preventive medicine. In striving to address these trends, the training institutions have to meet the demands for the production of competent and skilled human resource for the health sector. In order to accomplish this, there is need for constant review of the curriculum to incorporate the changes that occur in the world in general and Zambia in particular. These reviews assist in providing quality training to students and improved health care to the general public.

The Environmental Health Technologist (EHT) operates under various legal frame works where s/he derives powers. It is therefore imperative that the officer should be given adequate training in order to equip him/her with adequate knowledge and skills to apply these powers in the execution of his/her duties. The consequence of this is the general improvement of environmental health standards and the health status of the general public in Zambia. This curriculum is therefore designed in such a way that after training, the graduate will have acquired knowledge, attitudes and practical skills in the science and art of preventing disease, prolonging life and promoting physical, social and mental well-being.

The graduate will also be able to interpret and advise on aspects of human health including quality of life that is determined by physical, biological, social and psychosocial factors in the environment. In so doing s/he will be able to assess, correct, control and prevent those factors in the environment that can potentially or adversely affect people's health.

## **2.0 PROGRAMME MISSION STATEMENT AND VISION**

### **2.1 Mission Statement**

Harvest University is committed to creating and enriching the academic, personal and professional growth and at the same time disseminating knowledge leading to academic and research excellence along with developing individuals for a better tomorrow.

### **2.2 Vision**

Harvest University thrives on Christian values and fosters lifelong academic excellence. In this regard, Harvest University strives to move towards becoming a world-class university with a transformative impact on society and economic development through continual innovation in higher education, research, creativity and entrepreneurship.

### **3.0 INSTITUTIONAL VALUES**

Harvest University underpins and upholds the following values in the provision of tertiary education:

#### **3.1. Quality and Excellence:**

Harvest University is committed to providing quality product or service and excellence in all disciplines that fall under its jurisdiction. The Harvest University believes in the provision of the service that is excellent, adequate, dependable and economic to students. In providing this mandate, it calls for hard work by students, lecturers and supportive staff of Harvest University

#### **3.2 Integrity, Trust, and Respect:**

Harvest University is committed to ensuring trust and respect for all persons in an environment becomes an integral part of our leadership. As an institution that cultivates Christian values, Harvest University strives to achieve institutional integrity in providing higher education to local and international students.

#### **3.3 Research, Innovation, and Creativity:**

Harvest University is committed to the pursuit of inquiry and discovery and to the creation and dissemination of knowledge.

#### **3.4 Freedom of Expression:**

Harvest University is committed to the free exchange of ideas in a constructive and civil environment, including the canons of academic freedom in research, teaching, and outreach.

#### **3.5 Stewardsip and Accountability:**

The Harvest University is committed to serving as ethical and responsible stewards of University resources. In order to achieve good corporate governance and quality assurance in managing human and other resources, transparent and prudent decisions are key to the growth of the university.

### **4. ENTRY REQUIREMENTS**

For the candidate to be eligible for admission to the Diploma in Environmental Health Sciences programme must meet the following:

#### **4.1 Direct entry**

5.1.1 A minimum age of 18 years

5.1.2 Be in possession of five (5) 'O' levels passed at credit level or better in acceptable subjects which must include the following: English Language, Mathematics, Physics, Chemistry or Science, Biology and any other subject.

#### **4.2 Mature entry**

4.2.1 Certificate in Community Health Assistant and

4.2.2 Be in possession of five (5) 'O' levels passed at credit level or better in acceptable subjects which must include the following: English Language, Mathematics, physics, Chemistry or Science, Biology and any other subject. Geometrical drawing is an added advantage.

4.2.3 Registration certificate and valid practicing certificate from the HPCZ

## 5. PROGRESSION CRITERIA

### 5.1 First Year: First Semester

5.1.1 There are six (6) courses in this semester.

5.1.1.1 A student who obtains grade D in two (2) courses will be required to write supplementary examination in the course(s) failed provided continuous assessment is passed.

5.1.1.2 A student who obtains D in three (3) courses without passing the continuous assessment or fails a supplementary examination will be required to repeat the semester. The following criteria shall apply for repeat semester:

5.1.1.3 Grade D in three (3) courses with failed continuous assessment.

5.1.1.4 Failure in supplementary examination.

5.1.1.5 A student may repeat a semester only once.

5.1.1.6 Continuous assessment shall carry 40% of the total final grade in each course.

5.1.1.7 The final examination in each course shall constitute 60%.

5.1.1.8 A student shall be deemed to have passed end of semester examination if s/he obtains 50% or more in each course which includes continuous assessment and final examination.

5.1.1.9 A student who passes supplementary examinations shall be awarded a grade of P for pass.

5.1.1.10 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:

5.1.1.11 Failure in four courses or more.

5.1.1.12 Failure in repeated semester.

### 5.2 First Year: Second Semester

5.2.1 There are seven (7) courses in this semester.

5.2.2 A student who obtains grade D in three (3) courses will be required to write supplementary examination in the courses failed provided continuous assessment is passed.

5.2.3 A student who obtains grade D in four (4) courses or fails supplementary examination will be required to repeat the semester. The following criteria shall apply for repeat semester:

5.2.3.2 Grade D in four (4) courses with failed continuous assessment.

5.2.3.3 Failure in supplementary examination.

5.2.4 A candidate may repeat a semester only once.

5.2.5 Continuous assessment shall carry 40% of the total final grade in each course.

5.2.6 The final examination in each course shall constitute 60%.

5.2.7 A student shall be deemed to have passed end of semester examination if s/he obtains 50% or more in each course which includes continuous assessment and final examination.

5.2.8 A student who fails a field course shall repeat the semester for practical placement.

5.2.9 A student who passes supplementary examinations shall be awarded a grade of P for pass.

5.2.10 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:

5.2.10.2 Failure in five (5) courses or more.

5.2.10.3 Failure in repeated semester.

5.2.11 Failure in repeated field course.

### **5.3 Second Year: First Semester**

5.3.1 There are seven (7) courses in this semester.

5.3.2 A student who obtains grade D in three (3) courses will be required to write supplementary examination in the courses failed provided continuous assessment is passed.

5.3.3 A student who obtains grade D in four (4) courses or fails supplementary examination will be required to repeat the semester. The following criteria shall apply for repeat semester:

5.3.3.2 Grade D in four (4) courses with failed continuous assessment.

5.3.3.3 Failure in supplementary examination.

5.3.4 A candidate may repeat a semester only once.

5.3.5 Continuous assessment shall carry 40% of the total final grade in each course.

5.3.6 The final examination in each course shall constitute 60%.

5.3.7 A student shall be deemed to have passed end of semester examination if s/he obtains 50% or more in each course which includes continuous assessment and final examination.

5.3.8 A student who fails a field course shall repeat the semester for practical placement.

5.3.9 A student who passes supplementary examinations shall be awarded a grade of P for pass.

5.3.10 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:

5.3.10.2 Failure in five (5) courses or more

5.3.10.3 Failure in repeated semester.

5.3.10.4 Failure in repeated field course.

### **5.4 Second Year: Second Semester (Intermediate Examination)**

5.4.1 There are seven (7) courses in this semester.

5.4.2 A student shall be required to sit for an **ECHOS external examination (Intermediate Examination)**.

5.4.3 The Intermediate Examination shall be conducted at the end of second year. A student shall be deemed to have passed the intermediate examination if s/he obtains 50% or more marks in each course which includes continuous assessment and final examination.

5.4.4 A student who obtains grade D in maximum three (3) courses will be required to write supplementary examination in the courses failed provided continuous assessment is passed.

5.4.5 A student may repeat a semester only once.

5.4.6 Students shall be assessed as follows:

**5.4.6.2 Continuous assessment:** Continuous assessment shall carry 40% of the total final grade in each course.

**5.4.6.3 Final examination:** The final examination shall cover prescribed courses in this semester and it shall contribute 60%.

5.4.7 A student who obtains grade D in four (4) courses will be required to repeat the semester. The following criteria shall apply for **repeat semester:**

5.4.7.2 Grade D in four (4) courses

5.4.7.3 Failure in supplementary examination.

5.4.8 A student who passes supplementary examinations shall be awarded a grade of **P** for pass.

5.4.9 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:

5.4.9.2 Failure in five (5) courses or more.

5.4.9.3 Failure in repeated semester.

## **5.5 Third Year: First Semester**

5.5.1 There are seven (7) courses in this semester.

5.5.2 A student who obtains grade D in two (2) courses will be required to write supplementary examination in the courses failed provided continuous assessment is passed.

5.5.3 A student who obtains grade D in three courses will be required to repeat the semester. The following criteria shall apply for repeat semester:

5.5.3.2 Grade D in three (3) courses with failed continuous assessment.

5.5.3.3 Failure in supplementary examination.

5.5.4 The final examination in each course shall constitute 60%

5.5.5 A student shall be deemed to have passed end of semester examination if s/he obtains 50% or more in each course which includes continuous assessment and final examination.

5.5.6 A student who fails a field course shall repeat the semester for practical placement.

5.5.7 A student may repeat a semester only once.

5.5.8 A student who passes supplementary examinations shall be awarded a grade of P for pass.

5.5.9 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:

5.5.9.2 Failure in four (4) courses or more.

5.5.9.3 Failure in repeated semester.

5.5.9.4 Failure in repeated field course.

## **5.6 Third Year: Second Semester (Final Examination)**

There are seven (7) courses in this semester.

### **5.6.1 Final Examination:**

**5.6.1.2** This examination shall be conducted at the end of the training period. The total final grade for each course shall be 100%.

**5.6.1.3** A student shall be deemed to have passed the final examination if s/he obtains 50% or more in each course which includes continuous assessment and final examination.

- 5.6.1.4 There shall be final examination in each course offered during the semester and this shall carry 60% that will contribute to the final total grade.
- 5.6.2 A student who obtains grade D in three (3) courses shall be required to write supplementary examination in the courses failed provided continuous assessment is passed.
- 5.6.3 A student who obtains grade D in four (4) courses will be required to repeat the semester.
- 5.6.4 A student may repeat a semester only once.
- 5.6.5 A student who passes supplementary examinations shall be awarded a grade of P for pass (50%).
- 5.6.6 **Exclusion from the Programme:** The following criteria shall apply for exclusion from the programme:
- 5.6.6.2 Failure in five (5) courses or more.
- 5.6.6.3 Failure in repeated semester.

## 6. EXAMINATION GRADING SYSTEM

**All pass marks in the examinations, tests and assignments shall be graded in accordance with the University of Zambia grading system:**

Marks	Grade
90 – 100	A+ Upper Distinction
80 – 89	A Lower Distinction
70 – 79	B+ Meritorius
60 – 69	B Credit
55 – 59	C+ Definite Pass
50 – 54	C Bare Pass
45 – 49	D+ Bare Fail
40 – 44	D Fail
0 – 39	E Outright Fail

## 7. 0 DURATION OF THE PROGRAMME

The Diploma in Environmental Health Sciences for Environmental Health Technologist is of three (3) year duration.



## 8. CURRICULUM STRUCTURE

The curriculum structure is shown in the table below:

Course Code	Course Title
<b>First Year Courses</b>	
<b>First semester of the first year</b>	
BIO111	Biology
CHE111	Chemistry
MAT111	Mathematics
PHY111	Physics
SOP111	Socio-Psychology
ITC111	Information Technology & Communication Skills
<b>Second semester of the first year</b>	
HAP112	Human Anatomy & Physiology
MPP112	Microbiology, Parasitology & Pathology
FCN112	Food Chemistry & Nutrition
COH 112	Community Health
ENS112	Environmental Science
CND112	Communicable & Non-Communicable Diseases
CHP112	Community Health Practical
<b>Second Year Courses</b>	
<b>First semester of the second year</b>	
BUS211	Building Science
SWM211	Solid Waste Management
MER211	Medical Entomology & Rodent Control
PHA211	Public Health Administration
WAS211	Water Supply
PHL211	Public Health Law
RHP221	Rural Health Practical
<b>Second semester of the second year</b>	
BUT222	Building Technology
IDS212	Integrated Disease Surveillance & Response
FSH212	Food Safety & Hygiene
AAP212	Animal Anatomy & Physiology
WQS212	Water Quality Surveillance
SHE212	Sanitation & Hygiene Education
PHD212	Port Health and Disinfection – Theory and Field Practical
<b>Third Year Courses</b>	
<b>First semester of the third year</b>	
FIP311	Food Inspection, Preservation & Processing
REB311	Research & Biostatistics
CSM311	Chemical Safety & Management

HCW311	Health-Care Waste Management
WWM311	Wastewater Management
GMP321	General Meat Pathology
UHP331	Urban Health Practical
	<b>Second semester of the third year</b>
INP312	Inspection of Premises
ENE312	Environmental Epidemiology
EPC312	Environmental Monitoring & Pollution Control
OHS312	Occupational Health & Safety
HIS312	Health Management Information System
SMP332	Special Meat Pathology
PMI342	Practical Meat Inspection

### **CODING SYSTEM**

The explanation for the coding system is as follows:

**Letters:** These denote abbreviations of the course

**Figures:** Figure No. 1 - denotes year in which the course is offered.

Figure No. 2 - denotes number in series of themes for the course.

Figure No. 3 - denote semester in which the course is offered.

### **9.0 THE METHOD OF DELIVERY**

Courses are delivered through face to face format and the Online Distance Learning platform.

Students shall also be required to participate in an Internship Programme.

- Full time delivery
- Part time delivery
- Online distance learning delivery (ODL platform)

## 10. CURRICULUM MAP

	Semester 1						Semester 2					
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
<b>Year 1</b>	Biology						Human Anatomy & Physiology					
	Chemistry						Microbiology, Parasitology & Pathology					
	Mathematics						Food Chemistry & Nutrition					
	Physics						Community Health					
	Socio-Psychology						Environmental Science					
	Information Technology & Communication Skills						Communicable & Non-Communicable Diseases					
							Community Health Practicals					
<b>Year 2</b>	Building Science						Building Technology					
	Solid Waste Management						Integrated Disease Surveillance & Response					
	Medical Entomology & Rodent Control						Food Safety & Hygiene					
	Public Health Administration						Anatomy & Physiology of Food Animals					
	Water Supply						Water Quality Surveillance					
	Public Health Law						Sanitation & Hygiene Education					
	Rural Health Practicals						Port Health and Disinfection – Theory and Field Practicals					
<b>Year 3</b>	Food Inspection, Preservation & Processing						Inspection of Premises					
	Research & Biostatistics						Environmental Epidemiology					
	Chemical Safety & Management						Environmental Monitoring & Pollution Control					
	Health-Care Waste Management						Occupational Health & Safety					
	Wastewater Management						Health Management Information System					
	General Meat Pathology						Special Meat Pathology					
	Urban Health Practical						Practical Meat Inspection					

**11.0 TEACHING AND LEARNING PLAN**  
**First Year Courses (Diploma in Environmental Health)**

CODE	COURSE TITLE	HOURS OF LEARNING (IN WEEKS)													CREDIT POINTS
		Lectures		Tutorials		Laboratory		Seminars		Fieldwork		Assessments and Self Study		Total Notional Hours	
		Hrs /wk	No. of wks	Hrs /wk	No. of wks	Hrs/ wk	No. of wks	Hr s/ wk	No. of wks	Hrs /wk	No. of wks	Hrs/ wk	No. of wks		
BIO 111	Biology	3	15	1	10	1	15	-	-	-	-	2	15	100	10
CHE111	Chemistry	3	15	1	10	1	15	-	-	-	-	2	15	90	10
MAT 111	Mathematics	3	15	1	15	-	-	-	-	-	-	2	10	80	8
PHY 111	Physics	3	15	1	10	1	15	-	-	-	-	2	15	90	10
SOP111	Socio-Psychology	3	15	-	-	-	-	1	10	-	-	1	15	70	7
ITC 111	Information Technology and Communication Skills	3	15	-	-	2	15	-	-	-	-	1	15	90	9
HAP 112	Human Anatomy and Physiology	3	15	1	10	1	15	-	-	-	-	1	10	80	8
MPP 112	Microbiology, Parasitology and Pathology	3	15	-	-	2	15	-	-	-	-	1	15	90	9
FCN 112	Food Chemistry and Nutrition	3	15	1	10	-	-	1	5	-	-	1	10	70	7
COH 112	Community Health	3	15	-	-	-	-	1	5	2	10	1	10	80	8
ENS 112	Environmental Science	3	15	-	-	-	-	-	-	-	-	1	15	60	6
CND 112	Communicable and Non-Communicable Diseases	3	15	1	10			-	-	1	5	1	10	70	7
CHP 112	Community Health Practical	-	-	-	-	-	-	-	-	40	5	2	5	210	21
<b>Total</b>														<b>1200</b>	<b>120</b>

## Second Year Courses (Diploma in Environmental Health)

COURSE CODE	COURSE TITLE	HOURS OF LEARNING													CREDIT POINTS
		Lectures		Tutorials		Laboratory		Seminars		Fieldwork		Assessments and Self Study		Total Notional Hours	
		Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks		
BUS 211	Building Science	3	15	1	15	-	-	-	-	-	-	1	10	70	7
SWM 211	Solid Waste Management	3	15	-	-	-	-	-	-	2	10	1	15	80	8
MER 211	Medical Entomology and Rodent Control	3	15	-	-	1	10	-	-	2	5	1	15	80	8
PHA 211	Public Health Administration	3	15	-	-	-	-	-	-	3	5	1	10	70	8
WAS 211	Water Supply	3	15	-	-	1	10	-	-	1	10	1	15	80	8
PHL 211	Public Health Law	3	15	-	-	-	-	1	10	3	5	1	10	80	8
RHP 221	Rural Health Practical	-	-	-	-	-	-	-	-	40	5	2	5	210	21
BUT 222	Building Technology	3	15	-	-	-	-	-	-	2	10	1	15	80	8
IDS 212	Integrated Disease Surveillance and Response	3	15	1	10	-	-	-	-	1	5	1	10	70	7
FSH 212	Food Safety and Hygiene	3	15	1	15	1	10	-	-	1	10	1	10	80	8
AAP 212	Animal Anatomy and Physiology	3	15	1	15	1	10	-	-	-	-	1	10	80	8
WQS 222	Water Quality Surveillance	3	15	-	-	1	10	-	-	1	5	1	10	70	7
SHE 212	Sanitation and Hygiene Education	3	15	-	-	-	-	-	-	3	5	1	10	70	7
PHD 212	Port Health and Disinfection	3	15	-	-	-	-	-	-	3	5	1	10	70	7
<b>Total</b>														<b>1200</b>	<b>120</b>

### Third Year Courses (Diploma in Environmental Health)

COURSE CODE	COURSE TITLE	HOURS OF LEARNING													CREDIT POINTS
		Lectures		Tutorials		Laboratory		Seminars		Fieldwork		Assessments and Self Study		Total Notional Hours	
		Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks	Hrs/wk	No. of wks		
FIP 311	Food Inspection, Preservation and Processing	3	15	-	-	-	-	-	-	3	5	1	10	70	7
REB 311	Research and Biostatistics	3	15	1	5	-	-	-	-	-	-	1	10	60	6
CSM 311	Chemical Safety and Management	3	15	-	-	-	-	-	-	1	5	1	10	60	6
HCW 311	Health Care Waste Management	3	15	-	-	-	-	-	-	1	5	1	10	60	6
WWM 311	Waste Water Management	3	15	-	-	1	5	-	-	-	-	1	10	60	6
GMP 321	General Meat Pathology	3	15	-	-	-	-	-	-	3	5	1	10	70	7
UHP 331	Urban Health Practical	-	-	-	-	-	-	-	-	40	5	2	5	210	21
INP 312	Inspection of Premises	3	15	-	-	-	-	-	-	3	5	1	10	70	7
ENE 312	Environmental Epidemiology	3	15	1	5	-	-	-	-	-	-	1	10	60	6
EPC 312	Environmental Monitoring and Pollution Control	3	15	-	-	1	10	-	-	1	5	1	10	70	7
OHS 312	Occupational Health and Safety	3	15	-	-	1	10	-	-	1	5	1	10	70	7
HIS 312	Health Management and Information System	3	15	-	-	-	-	-	-	1	5	1	10	60	6
SMP 332	Special Meat Pathology	3	15	-	-	-	-	-	-	3	5	1	10	70	7
PMI 342	Practical Meat Inspection	-	-	-	-	-	-	-	-	40	5	2	5	210	21
<b>Total</b>														<b>1200</b>	<b>120</b>

## **12. PROGRAMME OBJECTIVES**

At the end of the training programme, students should be able to: -

- 12.1 Apply knowledge and skills in waste management.
- 12.2 Use scientific technology in the planning and construction of built environment and legislation related to building hygiene and services in both rural and urban areas.
- 12.3 Apply knowledge and skills of monitoring and evaluation of water technologies/sources, water treatment, water quality and water supply projects
- 12.4 Demonstrate the application of knowledge and skills in the identification, prevention and control of communicable and non-communicable diseases
- 12.5 Demonstrate the necessary knowledge and skills in the identification, management and control of pests and vectors of public health importance.
- 12.6 Conduct meat inspection in order to prevent and control transmission of zoonotic diseases of food animals to man
- 12.7 Inspect food and food premises in order to prevent fraud and food borne diseases.
- 12.8 Demonstrate understanding of social sciences and how they relate to environmental health issues.
- 12.9 Practice basic principles of law and the legal system.
- 12.10 Apply knowledge and skills of research to solve health problems.
- 12.11 Apply principles of environmental management to prevent and control environmental pollution.
- 12.12 Provide occupational health and safety services
- 12.13 Demonstrate the application of practical skills in the running of urban and rural public health services.

## **13. PROGRAMME LEARNING OUTCOMES**

On completion of the programme, the Environmental Health Technologist graduate should possess the following requisite skills:

- 13.1 Apply principles of environmental science to comprehend interactions among physical, chemical and biological components related to the environment and the impact on the biodiversity and sustainability from local and global development
- 13.2 Apply principles of physics and mathematics to understand the flux of material and energy interactions and construct mathematical models of environmental phenomena
- 13.3 Apply principles of chemistry and biology to comprehend the molecular interactions in natural systems and the fundamental effects within the plant and animal kingdom
- 13.4 Conduct sanitary surveys that promote hygienic practices.
- 13.5 Assess methods for collection, treatment, and disposal of waste to take appropriate sustainable approaches that promote hygienic practices
- 13.6 Apply legal and institutional framework' guidelines to manage solid waste.
- 13.7 Conduct routine water supply surveillance in controlling potential risks.
- 13.8 Assess the effectiveness of control measures put in place to ensure water quality
- 13.9 Promote timely implementation of action(s) in controlling potential risks during water supply surveillance
- 13.10 Conduct periodic inspections to determine the suitability of built environment and take appropriate measures
- 13.11 Inspect premises where food is prepared, preserved, packaged, stored and/or conveyed.
- 13.12 Collect food samples for analysis and take action based on the results

- 13.14 Carry out specific environmental functions that require litigation by instituting correct legal procedures
- 13.15 Train and supervise spray men in indoor residual spraying.
- 13.16 Apply appropriate interventions used in in the prevention and control of malaria
- 13.17 Conduct epidemiological surveys and investigations of communicable diseases
- 13.18 Apply procedures of rodent control in the implementation of interventions for proper management of rodent borne diseases
- 13.19 Apply the public health legislation and other relevant laws when carrying out fumigation process during the control vectors and rodents
- 13.20 Conduct research by adhering to the research process' principles in order to solve environmental and public health problems in a community
- 13.21 Apply biostatistics principles in research relating to data collection, data presentation, data analysis and data interpretation
- 13.22 Carry out routine inspections of premises, buildings, factories and swimming pools to ascertain their suitability for human use.
- 13.23 Provide timely advice in the field of environmental health services to facilitate informed decision making.
- 13.24 Manage and supervise preventive and promotive health programmes.
- 13.25 Liaises with line government departments in conducting environmental impact assessment arising from new projects.
- 13.26 Conduct occupational health and safety services and risk assessment in an enterprise in order to establish the safety of the work place
- 13.27 Implement appropriate control measures including compliance with regulatory requirements to prevent or minimize the risks in a work place for the benefit of the worker and the enterprise
- 13.28 Implement First Aid procedures in a work place in order to reduce effects of accidents and injuries, thereby promoting occupational health and safety
- 13.29 Apply port health principles and procedures in executing various functions at Port Health facilities and ground crossings in order to prevent, control or eliminate diseases of transboundary nature



## 14. COURSE CONTENT

### 14.1. FIRST YEAR FIRST SEMESTER COURSES

<b>Course code</b>	<b>First semester of the first year</b>
BIO111	Biology
CHE111	Chemistry
MAT111	Mathematics
PHY111	Physics
SOP111	Socio-Psychology
ITC111	Information Technology & Communication Skills

**COURSE TITLE: BIOLOGY**

**COURSE CODE: BIO111**

### **INTRODUCTION**

The course is designed to provide the students with knowledge and understanding of complex forms involving humans, animals and plants. The course will also help students to understand the interaction between humanity and the world as it relates to environmental health.

### **COURSE AIM:**

To provide students with a basic conceptual framework and logical structure to understand biological phenomena as related to environmental health.

### **COURSE OBJECTIVES:**

1. Describe evolutionary hypotheses of life and the biomolecules.
2. Explain the physico-chemical foundations of life
3. Explain the basic structure and functions of biomolecules.
4. Describe the structure and functions of cell components.
5. Classify the different life forms.

### **COURSE LEARNING OUTCOMES:**

1. Illustrate the dumbbell and hour glass theories.
2. State the rationale of RNA preceding both DNA and Protein
3. Elucidate functions nucleic acids.
4. Identify the biomolecules using their structures
5. Classify amino acids
6. Relate structure of biomolecules to function.
7. Illustrate protein biosynthesis.
8. Distinguish between prokaryotic and eukaryotic cells, plant and animals.
9. Explain the fluid mosaic model of membranes.
10. Relate cell ultrastructure to cell function.
11. Use a microscope.
12. Calculate magnification.
13. Classify organisms.
14. Differentiate closely related organisms.
15. Construct a simple classification key.

### **COURSE CONTENT:**

#### **UNIT 1: EVOLUTIONARY HISTORY OF BIOMOLECULES AND THE CELL**

- 1.1 Hour glass and dumbbell theories.
- 1.2 Evidence of RNA rich primitive earth conditions.

## **UNIT 2: PHYSICO-CHEMICAL FOUNDATIONS OF LIFE**

### **2.1 Biophysics**

- 2.1.1 Hydrogen ion concentration-pH
- 2.1.2 Buffers
- 2.1.3 Osmosis and osmotic pressure.
- 2.1.4 Gibbs Domain equilibrium.
- 2.1.5 Colloids
- 2.1.6 Surface tension.
- 2.1.7 Absorption
- 2.1.8 Viscosity.

## **UNIT 3: BIOMOLECULES**

### **3.1 Carbohydrates**

- 3.1.1 Definition
- 3.1.2 Classification and general structure of carbohydrates: monosaccharaides, oligosaccharides and polysaccharides
- 3.1.3 Functions

### **3.2 Lipids**

- 3.2.1 Definition
- 3.2.2 Classification and general structure of lipids (fatty acids, triglycerides, phospholipids, sphingolipids and ketone bodies)
- 3.2.3 Function

### **3.3 Protein structure and function 3.3.1**

- General structure of amino acids
- 3.3.2 Classification of amino acids.
- 3.3.3 Functions of amino acids.
- 3.3.4 Proteins
- 3.3.5 Classification of proteins (simple, conjugated and derived)
- 3.3.6 Four level of protein architecture

### **3.4 Nucleic acids**

- 3.4.1 Introduction.
- 3.4.2 Bases: pyrimidines and purines.
- 3.4.3 Sugars (pentose sugars: ribose and deoxyribose)
- 3.4.4 Deoxyribose nucleic acids (DNA) and ribose nucleic acids
- 3.4.5 Biologically important nucleotides (NAD, ATP).

### **3.5 Protein biosynthesis**

- 3.5.1 Central dogma of molecular biology.
- 3.5.2 General characteristics of the genetic code
- 3.5.3 Salient features of the four steps of protein biosynthesis.
- 3.5.4 Post-translational modification.

## **UNIT 4: CELL ORGANISATION, SUBCELLULAR STRUCTURE AND CELL DIVISION**

### 4.1 Introduction

- 4.1.1 Cell theory
- 4.1.2 Cell types: prokaryotes and eukaryotes.
- 4.1.3 Cell size and shape

### 4.2 Mycoplasmas, rickettsia, Viruses and prions.

### 4.3 Generalized prokaryotic cell

### 4.4 Eukaryotic cell organization:

- 4.4.1 Plasma membranes
- 4.4.2 Cytosol, cytoplasmic matrix and cytoplasmic inclusion.
- 4.4.3 Structure and function of the organelles: nucleus; endoplasmic reticulum.; mitochondrion; golgi bodies; ribosomes; plastids; vacuoles; cell division; cell cycle; and mitosis and meiosis.

## **UNIT 5: DIVERSITY OF LIFE FORMS.**

### 5.1 Hierarchical organization of life.

### 5.2 Classification of organisms

#### 5.2.1 Levels of grouping organisms

#### 5.2.2 Domains

##### 5.2.2.1 Kingdoms

##### 5.2.2.1.1 Difference between taxonomy and classification.

##### 5.2.2.1.2 Nomenclature of the major animal and plant groups

## **TEACHING METHODS**

1. Lectures.
2. Group work
3. Practical
4. Demonstrations

## **NOTIONAL HOURS: 110 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/laboratory work: 2 hours per week
4. Assessment and self-study: 2 hours per week

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS**

1. Tortora, G.J and Berdell R. (2005). **Microbiology: An Introduction. 12th Edition.** Benjamin Cummings.
2. Melnick, J. and Adelbergs, G.F. (2013). **Medical Microbiology, 26th Edition,** Churchill Livingstone
3. Madigan, M.T and Martinko, J.M. (2014). **Brock Biology of Microorganisms.** 14th Edition. Benjamin Cummings

## **RECOMMENDED READINGS**

1. Greenwood, D., Slack, R., Barer, M. and Irving, W. (2014). **Medical Microbiology. 18th Edition.**
2. Leboffe, J.M and Pierce, B.E. (2010). **Microbiology: Laboratory Theory and Application, Third Edition.** Morton Publishing Company.
3. Murray, P.R., Rosenthal, K.S and Tenover, M.A. (2012). **Master the essentials of medical microbiology.** Elsevier Health Sciences.

**COURSE TITLE: CHEMISTRY****COURSE CODE: CHE111****INTRODUCTION**

The course forms the basis for helping students to understand matter and its interactions with other matter and energy. Additionally, it will assist students to understand the world around them in relation to environmental health.

**COURSE AIM:**

To equip students with basic concepts and experimental skills in chemistry

**COURSE OBJECTIVES**

1. Describe physical states of matter
2. Explain atomic structure and electronic configuration
3. Explain the periodic table trends
4. Explain chemical bonding, structure and shape of molecules
5. Apply the principles of Stoichiometry
6. Explain principles of solubility and solution properties
7. Classify Intermolecular forces
8. Explain equilibrium
9. Explain key concepts in organic chemistry

**COURSE LEARNING OUTCOMES**

1. Describe physical states of matter
2. Explain the composition of matter
3. Illustrate the atomic structure and electron configuration
4. Describe the Kinetic theory of gases
5. Differentiate Relative atomic mass from Relative molecular mass.
6. Perform stoichiometric calculations
7. Perform volumetric analysis
8. Write acid-base, precipitation and redox reactions
9. Describe the groups of Periodic Table
10. Identify elements found in Groups III to VI in the Periodic Table.
11. Demonstrate understanding of empirical and molecular formulae.
12. Explain the mole concept
13. Illustrate the Mole relationship of reactants and products
14. Describe the quantum mechanical module an atom
15. Apply principles of solubility
16. Explain and predict the chemical bonding in, and the structure and shape of, simple molecules.
17. Elucidate types of bond
18. Demonstrate knowledge on intermolecular forces
19. Handle equipment/glassware, in making observations, recording and analysis of data

20. Apply knowledge and skills of chemistry to environmental health
21. Perform the process of balancing of Oxidation-reduction Reaction Equations
22. Determine empirical and molecular formulae
23. Describe acids and bases
24. Classify organic functional groups

## **COURSE CONTENT**

### **UNIT 1: PHYSICAL STATES OF MATTER**

- 1.1 States of Matter: Solid, Liquid, Gas, Plasma, Liquid crystal state, Bose Einstein condensate
- 1.2 Composition of matter: pure substance and mixtures.
- 1.3 Nature of solids, liquids and gases.
- 1.4 Kinetic theory of gases: Van der Waals equation.

### **UNIT 2: ATOMIC STRUCTURE AND ELECTRON CONFIGURATION.**

- 2.1 Atomic Models, Atoms, molecules and ions
- 2.2 Light and spectra; Bohr model of the atom.
- 2.3 Quantum mechanical model and Electron configuration.

### **UNIT 3: PERIODS TABLE TRENDS**

- 3.1 Atomic radius, ionization potential, electron affinity, electronegativity
- 3.2 Groups of the periodic table
- 3.3 Groups III to VI elements.
- 3.4 Seven d block elements (Cr, Mn, Fe, Co, Ni, Cu, Zn) : Occurrence, extraction and use.
- 3.5 The Halogens and Noble Gases.

### **UNIT 4: CHEMICAL BONDING, STRUCTURE AND SHAPE OF MOLECULES.**

- 4.1 Types of Bonds: Ionic bond, Covalent Bonds, Metallic Bonds.
- 4.2 VSEPR theory, shapes of molecules, Lewis structures; resonance, polar molecules.
- 4.3 Introduction to Molecular orbital theory and hybridization.

### **UNIT 5: STOICHIOMETRY**

- 5.1 Relative atomic mass and Relative molecular mass.
- 5.2 Percentage composition; Atomic mass from percentage composition.
- 5.3 Determination of empirical and molecular formulae.
- 5.4 The mole concept-, Avogadro's number.
- 5.5 Mole relationship of reactants and products.
- 5.6 Reactions in solution; Molarity, Acids-Bases reactions and titration (Volumetric Analysis)
- 5.7 Types of Reactions and Balancing of Oxidation-reduction Reaction Equations.

### **UNIT 6: SOLUTIONS AND THEIR PROPERTIES**

- 6.1 Principles of solubility; enthalpy of solution; effect of temperature and Pressure on solubility, Henry's Law.
- 6.2 Colligative properties: vapor pressure lowering, Raoul's Law; boiling

- 6.3 Point elevation; freezing point depression; osmotic pressure
- 6.4 Handling of laboratory equipment

### **UNIT 7: INTERMOLECULAR FORCES**

- 7.1 Intermolecular forces: dipole-dipole bonds, polar molecules; dispersion forces; polarizability;
- 7.2 Hydrogen bonding. Applications in liquids: surface tension; capillary action; viscosity; dimerization of carboxylic acids.
- 7.3 Changes of state; vapor pressure; critical point.
- 7.4 Clausius-Clapeyron equation; phase equilibrium.

### **UNIT 8: EQUILIBRIUM**

- 8.1 Chemical equilibria (Le-chateller's principle)
- 8.2 Acids and bases: pH, buffers and hydrolysis of salts,
- 8.3 Solubility product constants.

### **UNIT 9: INTRODUCTION TO ORGANIC CHEMISTRY**

- 9.1 Nomenclature and Classification and of organic compounds: Classification of organic functional groups, IUPAC system: Naming of alkanes, alkenes, alkynes, alkyl halides, alcohols, and cycloalkanes.
- 9.2 Isomerism: structure isomerism; basic treatment of cis- trans isomerism with reference to C=C and cycloalkanes only.
- 9.3 Hydrocarbons: structure, physical properties and reactivity; Combustion of hydrocarbons;
- 9.4 Reactions: Mechanism of halogenation, orientation and relative reactivities of alkanes.

### **TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Demonstrations
- 4. Group discussions

### **NOTIONAL HOURS: 110 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/laboratory work: 2 hours per week
- 4. Assessment and self-study: 2 hours per week



## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. American Chemical Society (2014). **Chemistry in Context; 5th edition**
2. Whitten, K.W., Raymond E. D., Larry M. P. and Stanley G.G. (2014). **General Chemistry. 7th Edition.**
3. Steven Zumdahl and Susan Zumdahl (2007). **Chemistry. 6th edition.**

## RECOMMENDED READINGS

1. John W.Hill and McCreary T.W. (2015). **Chemistry for Changing Times. 14<sup>th</sup> edition.** Macmillan Publishing Company.
2. Karen C. T. (2013). **Chemistry: An Introduction to General, Organic, and Biological Chemistry.** Benjamin Cummings.
3. Zumdahl and Zumdahl (2013). **Student Solutions Guide for Chemistry.**

**COURSE TITLE: MATHEMATICS****COURSE CODE: MAT111****INTRODUCTION**

The course is designed to equip students with knowledge of mathematics vocabulary, facts, concepts, principles, laws, methods and procedures with a view to relating the relevance of mathematics to environmental health strategies.

**COURSE AIM**

To equip students with mathematical principles applicable in environmental health strategies

**COURSE OBJECTIVES**

1. Demonstrate understanding of BODMAS, decimals, percentages, ratios and indices
2. Demonstrate ability to solve algebraic problems
3. Demonstrate ability to solve series
4. Demonstrate understanding of mensuration, geometry and trigonometry
5. Solve vectors
6. Apply differentiation
7. Solve basic integration
8. Draw basic graphs
9. Use statistical data

**COURSE LEARNING OUTCOMES**

1. Simplify mathematical expressions containing brackets, operational signs, decimals,
2. ratios and percentages
3. Perform calculations involving quadratic function and equation
4. Solve exponential, trigonometric and simultaneous equations
5. Decompose fractions into partial fractions
6. Perform calculations involving complex numbers
7. Apply the limiting process, the chain, product and the quotient rules in differentiation
8. Apply differentiation to increasing and decreasing functions
9. Apply integration to function-related equations and areas
10. Calculate angles in a triangle and in a circle
11. Work out surface areas and volumes of plane shapes and solids
12. Calculate averages, means, modes and medians of data
13. Draw basic graphs and charts for statistical data

**COURSE CONTENT****UNIT 1: BODMAS, DECIMALS, PERCENTAGES, RATIOS AND INDICES:**

- 1.1 BODMAS concept
- 1.2 Decimals, percentages and ratios
- 1.3 Indices

## **UNIT 2: FUNCTIONS AND EQUATIONS:**

- 2.1 Introduction to Algebra
- 2.2 Logarithmic and exponential functions
- 2.3 Quadratic function and equation;
- 2.4 Simultaneous equations;
- 2.5 Partial fractions
- 2.6 Complex numbers

## **UNIT 3: SERIES:**

- 3.1 Introduction to series
- 3.2 Arithmetic sequence
- 3.3 Arithmetic series
- 3.4 Geometric sequence
- 3.5 Geometric series

## **UNIT 4: MENSURATION, GEOMETRY AND TRIGONOMETRY:**

- 4.1 Areas and volumes of solids; and
- 4.2 Properties of regular and irregular solids
- 4.3 Coordinate geometry
- 4.4 Circle geometry
- 4.5 Measuring angles;
- 4.6 Solving a right-angled triangle
- 4.7 Solving any triangle
- 4.8 Trigonometric identities
- 4.9 Trigonometric equations

## **UNIT 5: VECTORS:**

- 5.1 Definition and properties;
- 5.2 Adding and subtracting: graphical methods;
- 5.3 Adding and subtracting: components method;
- 5.4 Position vectors

## **UNIT 6: DIFFERENTIATION:**

- 6.1 Limiting process;
- 6.2 Rules of differentiation;
- 6.3 Applications of differentiation

## **UNIT 7: INTEGRATION:**

- 7.1 Anti-differentiation
- 7.2 Indefinite Integrals
- 7.3 Notation
- 7.4 Rules of integration
- 7.5 Definite integrals
- 7.6 Applications of integration

## **UNIT 8: GRAPHING:**

- 8.1 Quadratic function;
- 8.2 Logarithmic function;
- 8.3 Exponential function
- 8.4 Trigonometric functions
- 8.5 Sketching graphs;

## **UNIT 9: STATISTICS:**

- 9.1 Accuracy and approximation;
- 9.2 Collection of data;
- 9.3 Compilation and presentation of data;
- 9.4 Averages, medians, means and modes.

## **TEACHING METHODS**

- 1. Lectures
- 2. Tutorials

## **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Assessment and self-study: 1 hour per week

## **ASSESSMENT METHODS**

- |                                  |             |
|----------------------------------|-------------|
| <b>1. Continuous assessment:</b> | <b>40 %</b> |
| 1.1 2 Tests:                     | 30%         |
| 1.2 2 Assignments:               | 10%         |
| <b>2 Final Examinations:</b>     | <b>60%</b>  |
| 2.1 Theory:                      | 60%         |

## **PRESCRIBED READINGS:**

- 1. Talbert, J.F. & Heng, H.H. (2006). **Additional Mathematics: Pure and Applied**. Pearson Education South Asia Pte Ltd.
- 2. Wallace, T. (2010). **Beginning and Intermediate Algebra**. CC-BY.
- 3. Yeo, J., Seng, T. K., & Yee, L. C., (2013). **New Syllabus Additional Mathematics**. Textbook, 9<sup>th</sup> edition. Kewairam Hillview: Shinglee Publishers Pte Ltd.

## **RECOMMENDED READINGS**

- 1. Buckle, N., Dunbar, L. (2007). **International Baccalaureate Mathematics – Higher Level (Core)**. 3<sup>rd</sup> edition, 3<sup>rd</sup> imprint. Victoria: IBID Press.
- 2. Central Statistics Office (2015). **Zambia Demographic and Health Survey**. Lusaka: CSO
- 3. Fradkin, L. (2012). **Differential calculus simplified to the bone**. <http://www.soundmathematics.com>

## **COURSE TITLE: PHYSICS**

**COURSE CODE: PHY111**

### **INTRODUCTION**

The course is designed to provide students with various concepts in physics as they apply to environmental health.

### **COURSE AIM:**

To equip the students with knowledge and skills and how to apply them to environmental strategies

### **COURSE OBJECTIVES**

1. Apply the SI units and measurement symbols
2. Explain vectors and vector calculations
3. Explain motion and its terms
4. Explain the Newton's laws of motion
5. Explain circular motion and gravitation
6. Explain moments and simple machines
7. Explain energy and momentum Explain harmonic motion
8. State mechanical properties of matter
9. Explain harmonic motion
10. Describe the concepts of fluid dynamics and its application to fluid flow
11. Recognize thermal properties of matter
12. Explain thermodynamic principles
13. Explain principles of waves
14. Explain Electricity and magnetism
15. Describe electromagnetic induction
16. Explain the principles of light and physical optics
17. Explain Atomic physics and radioactivity
18. Apply ultrasonic
19. Describe the physics of communications

### **COURSE LEARNING OUTCOMES**

1. Apply measurement standards to practical applications
2. Demonstrate skills in handling equipment, making observations, analysis and
3. recording of data
4. Identify safety, health and environmental issues associated with force, acceleration,
5. and rotational movements
6. Apply force, acceleration, kinematics and vector algebra to practical application
7. Apply work, energy and momentum to practical application
8. Perform energy and mass calculations
9. Identify safety, health and environmental issues associated with fluids and fluid
10. mechanics
11. Perform calculations associated with fluids and fluid flow
12. Explain principles of fluids and fluid flow mechanics and their practical applications

13. Distinguish between analog and digital as means of communication
14. Identify safety, health and environmental associated with thermodynamics
15. Apply thermodynamics principles to practical applications
16. Perform calculations associated with thermodynamics
17. Identify safety, health and environmental issues associated with sound waves and
18. ultrasonic waves
19. Apply sound waves and Ultrasonic waves to practical application
20. Perform measurements associated with sound waves and Ultrasonic waves
21. Identify safety, health and environmental associated with electricity and magnetism
22. Apply electricity and magnetism to practical applications
23. Perform measurements using electrical equipment
24. Perform basic calculations associated with electricity and magnetism
25. Explain principles of radioactivity and their application in the management of radioactive materials
26. Elucidate the functions of nuclear energy
27. Explain the
28. Identify safety, health and environmental issues associated with electromagnetic
29. waves and light
30. Apply electromagnetic wave and principles of light to practical application
31. Identify safety, health and environmental issues associated with radioactivity
32. Identify equipment used in communication
33. Identify safety, health and environmental issues associated with communication
34. Equipment
35. Explain principles of electricity and magnetism
36. Apply communication technology to practical application

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION**

- 1.1 Standard International Units:
  - 1.1.1 Dimensions and dimensional methods;
  - 1.1.2 Handling data;
  - 1.1.3 Scientific notation

### **UNIT 2: VECTORS:**

- 1.1 Definition and types;
- 1.2 Vector addition;
- 1.3 Vector subtraction;
- 1.2.4 Vector resolution

### **UNIT 3: MOTION:**

- 3.1 Definition and its terms;
- 3.2 Kinds of motion: Uniform and Non-Uniform;
- 3.3 Types of Motion
- 3.4 Linear motion
- 3.5 Projectile motion

- 3.6 Angular motion
- 3.7 Harmonic and Circular motion

**UNIT 4: NEWTON'S LAWS OF MOTION:**

- 4.1 Newton's First Law of Motion;
- 4.2 Newton's Second Law of Motion;
- 4.3 Newton's Third Law of Motion

**UNIT 5: CIRCULAR MOTION AND GRAVITATION:**

- 5.1 Centripetal force;
- 5.2 Centripetal acceleration;
- 5.3 Gravitation and Gravity;
- 5.4 Earth Satellites and Weightlessness

**UNIT 6: MOMENTS AND SIMPLE MACHINES:**

- 6.1 Moments of force;
- 6.2 Types of equilibrium; and
- 6.3 Simple machines:
- 6.4 Screw,
- 6.5 Pulley

**UNIT 7: ENERGY AND MOMENTUM:**

- 7.1 Work, Power, Energy and Momentum;
- 7.2 Conservation of Energy and Momentum;
- 7.3 Elastic and Non-elastic collision

**UNIT 8: HARMONIC MOTION:**

- 8.1 Simple harmonic motion;
- 8.2 Elastic potential energy;
- 8.3 Simple pendulum; and
- 8.4 Hooke's law

**UNIT 9: MECHANICAL PROPERTIES MATTER:**

- 9.1 Solids, liquids and gases;
- 9.2 Density
- 9.3 Elasticity;
- 9.4 Young's modulus;
- 9.5 Shear modulus; and
- 9.6 Bulk modulus

**UNIT 10: FLUID MECHANICS:**

- 10.1 Pressure;
- 10.2 The hydraulic press;
- 10.3 Buoyancy;
- 10.4 Fluids at rest;
- 10.5 Fluid flow;

- 10.6 Bernoulli's equation and its application;
- 10.7 Viscosity; and
- 10.8 Surface tension

**UNIT 11: THERMAL PROPERTIES OF MATTER:**

- 10.1 Temperature measurement and temperature scales;
- 10.2 Thermal expansion;
- 10.3 Internal energy and heat;
- 10.4 Heat capacity;
- 10.5 Specific heat capacity;
- 10.6 Mechanism of heat transfer (Conduction, Convection and Radiation);
- 10.7 Thermal resistance

**UNIT 12: THERMODYNAMICS:**

- 12.1 First law of Thermodynamics;
- 12.2 Work done by and on a gas;
- 12.3 Second law of Thermodynamics;
- 12.4 Carnot engine;
- 12.5 Refrigerators and thermodynamics of refrigeration; and
- 12.6 Internal combustion engines

**UNIT 13: WAVES:**

- 13.1 Description and types: Standing waves, Transverse and longitudinal waves;
- 13.2 Sound wave and its interference;
- 13.3 Sound intensity;
- 13.4 The Ear and its frequency response to Sound waves;
- 13.5 Doppler effect;
- 13.6 The decibel

**UNIT 14: ELECTRICITY AND MAGNETISM:**

- 14.1 Electrical charge and Electrical force;
- 14.2 Electric field and Coulomb's law;
- 14.3 Electrical potential, Capacitance;
- 14.4 Electromotive force and direct current;
- 14.5 Magnetism: magnetic properties and materials;
- 14.6 Alternating current;
- 14.7 Magnetic field of a current;
- 14.8 Circuits: DC (Ohm's law), and AC circuits;
- 14.9 Electrical power;
- 14.10 Electrical meters: Voltmeter, Ampere meter, Oscilloscope
- 14.11 Plugs and fuses

**UNIT 15: ELECTROMAGNETIC INDUCTION:**

- 15.1 Magnetic energy and inductance;
- 15.2 Moving wire in a magnetic field;
- 15.3 Faraday's law;



- 15.4 The motor;
- 15.5 The generator; and
- 15.6 The Transformer

#### **UNIT 16: LIGHT AND PHYSICAL OPTICS:**

- 16.1 Electromagnetic wave;
- 16.2 Quantum theory of light;
- 16.3 Huygen's principle;
- 16.4 Interference of light;
- 16.5 Double slit; diffraction and diffraction grating;
- 16.6 Reflection and refraction of light (total internal reflection and index of refraction);
- 16.7 Polarization and scattering;
- 16.8 Luminous flux and illumination

#### **UNIT 17: ATOMIC PHYSICS AND RADIOACTIVITY**

- 17.1 Atomic excitation and Laser
- 17.2 Radioactive decay
- 17.3 Activity and Half-life;
- 17.4 Types and properties of nuclear radiation
- 17.5 Radio isotopes
- 17.6 Applications: X-rays and Gamma rays
- 17.7 Nuclear reactors
- 17.8 Hazards and Safety precautions

#### **UNIT 18: ULTRASONIC:**

- 18.1 Production of ultrasound; and
- 18.2 Applications of ultrasound

#### **UNIT 19: THE PHYSICS OF COMMUNICATIONS:**

- 19.1 Communication systems and channels
- 19.2 Communication networks (intranet, internet, WIFI,)
- 19.3 Noise, attenuation, bandwidth
- 19.4 Radio transmission and mobile phone technology
- 19.5 Tuned circuits, Aerials and Amplifiers
- 19.6 Television and video
- 19.7 Fibre optic communication

#### **TEACHING METHODS**

1. Lectures
2. Role play
3. Practical
4. Group discussion
5. Demonstrations
6. Laboratory exercises
7. Industrial visit

## **NOTIONAL HOURS: 110 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/laboratory work: 2 hours per week
4. Assessment and self-study: 2 hours per week

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS**

1. Hecht, E. (2012). **College Physics**. 11<sup>th</sup> Edition. McGraw-Hill
2. Giancoli, D.C. (2013). **Physics: Principles with Application**. 7th Edition. Addison-Wesley
3. Adams, S and Jonathan, A. (2000). **Advanced Physics**. Oxford: Oxford University press

## **RECOMMENDED READINGS**

1. Feynman R.P. (2014). **The Feynman Lectures on Physics**. Basic Books.
2. Fischer-Cripps, A.C. (2003). **The Physics Companion**. 1st Edition. CRC Press
3. Halpern, A. (2011). **3000 Solved problems in Physics**. 1st Edition. McGrall-Hill

## **COURSE TITLE: SOCIO-PSYCHOLOGY**

**COURSE CODE: SOP111**

### **INTRODUCTION**

This course is designed to help students understand the social conditions that affect psychological wellbeing and to describe the process linking the social conditions to their psychological effects. The course also assists the students to develop a framework for understanding the different psychological approaches as they apply to environmental health.

### **COURSE AIM**

To equip students with knowledge, skills and attitudes for socio-psychological application in environmental health.

### **COURSE OBJECTIVES**

1. Describe the scope and basic approaches in sociology.
2. Describe the influence of cultural beliefs and practices on human behaviour and health
3. Outline the importance of socialisation and social networks in health
4. Explain the concept of social stratification
5. Describe the concept of sociology applied to health
6. Describe the scope and basic approaches in psychology
7. Outline the interactions between motivation and behaviour
8. State learning and memory enhancing techniques
9. Explain emotions in relation to health

### **COURSE LEARNING OUTCOMES**

1. Describe the process of socialisation
2. Explain the importance of social networks in environmental health related activities
3. Apply the concept of sociology applied to Health
4. Demonstrate knowledge on of how culture influences health.
5. Identify social and behavioural aspects of emotions
6. Compare personality theories
7. Identify main features of a personality theory
8. Illustrate how built environment relates to socio-psychological aspects
9. Define social epidemiology
10. Explain the influence of cultural beliefs and practices on human behaviour and health
11. Display sensitivity in dealing with communities
12. Analyse the relationship between human behaviour and diseases
13. Summarise the history and common approaches in psychology
14. Describe the relationship between socio-psychology and other professions
15. Define motivation
16. Explain theories of motivation
17. Assess the interaction between motivation and behaviour
18. Identify mental processes and factors involved in learning and memory

## **COURSE CONTENT**

### **UNIT 1: SOCIOLOGY**

#### **1.1 Introduction to Sociology:**

- 1.1.1 Definition of Sociology
- 1.1.2 Sociological perspectives and relevance to public health
- 1.1.3 Sociological inquiry

#### **1.2 Culture:**

- 1.2.1 Definition;
- 1.2.2 Components of culture;
- 1.2.3 Importance/function of culture;
- 1.2.4 Factors of culture change;
- 1.2.5 Subculture;
- 1.2.6 Deviant behaviour; 1.2.7 Cultural influence on health
- 1.2.8 Social stigma.

#### **1.3 Socialization:**

- 1.3.1 Definition;
- 1.3.2 Process
  - 1.3.2.1 Agent: Family; Marriage; Religion; Economy System; Political system; and Education

#### **1.4 Social stratification:**

- 1.4.1 Definition;
- 1.4.2 Class;
- 1.4.3 Race;
- 1.4.4 Ethnicity; and
- 1.4.5 Sex and Gender.

#### **1.5 Sociology applied to Health:**

- 1.5.1 Introduction;
- 1.5.2 Health as a social concept;
- 1.5.3 Social basis of disease;
- 1.5.4 Social role of preventive medicine;
- 1.5.5 Social factors in disease aetiology;
- 1.5.6 Health and Society;
- 1.5.7 Society and Environmental health; and
- 1.5.8 Social epidemiology.

### **UNIT 2: PSYCHOLOGY**

#### **2.1 Introduction to Psychology:**

- 2.1.1 Historical perspectives;
- 2.1.2 Applications and relations to other professions;

- 2.1.3 Approaches in psychology:
  - 2.1.3.1 New biological approach
  - 2.1.3.2 Humanistic approach
  - 2.1.3.3 Psycho analysis
  - 2.1.3.4 Behaviourism approach
  - 2.1.3.5 Cognitive approach.

## **2.2 Motivation:**

- 2.2.1 Motivation;
- 2.2.2 Maslow's hierarchy of needs;
- 2.2.3 Cultural influence on motivation;

## **2.3 Learning and Memory**

- 2.3.1 Definition:
- 2.3.2 Theories of learning
- 2.3.3 Memory processes and stages
- 2.3.4 Factors influencing forgetfulness
- 2.3.5 Techniques to enhance memory
- 2.3.6 Study techniques

## **2.4 Emotions:**

- 2.4.1 Emotions;
- 2.4.2 Psychological bases of emotions;
- 2.4.3 Behavioural aspects of emotions;
- 2.4.4 Physiological bases of emotions; and
- 2.4.5 Theories of emotion.

## **2.5 Personality:**

- 2.5.1 Personality;
- 2.5.2 Strategies for studying personality;
- 2.5.3 Personality theories; and
- 2.5.4 Heredity & environmental

## **2.6 Engineering and Environmental Psychology:**

- 2.6.1 Definitions;
- 2.6.2 Industrial safety and accident prevention; and
- 2.6.3 The built environment and related problems.

## **2.7 Community Psychology:**

- 2.7.1 Defence mechanisms
- 2.7.2 Individual and family counselling.

## TEACHING METHODS

1. Lectures
2. Case study
3. Role play
4. Demonstrations
5. Group discussions

## NOTIONAL HOURS: 80 HOURS

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
4. Assessment and self-study: 1 hours per week

## ASSESSMENT METHODS

- |                                  |             |
|----------------------------------|-------------|
| <b>1. Continuous assessment:</b> | <b>40 %</b> |
| 1.1 2 Tests:                     | 30%         |
| 1.2 2 Assignments:               | 10%         |
| <b>2. Final Examinations:</b>    | <b>60%</b>  |
| 2.1 Theory:                      | 60%         |

## PRESCRIBED READINGS

1. Ayers, S. and Visser, R. (2011). **Psychology for Medicine**. London: SAGE.
2. Openstax College (2013). **Introduction to Sociology**. Texas: Rice University.
3. Stangor, C. (2011). **Introduction to Psychology**. Fall.

## RECOMMENDED READINGS

1. Fieldman, R.S. (2013). **Understanding Psychology. 11<sup>th</sup> Edition**. New York. McGraw Hill
2. Heffernan, C.(2011). **Introduction to Medical Sociology – Lecture**,  
<http://www.drcah.net>
3. McGowan, F. (2011). **Introduction to Medical Sociology**:  
<http://www.icsmsu.com/eec/wp-content/uploads/2011/12/ABS-Sociology.pdf>.
4. Bechtel, R. B., and Churchman, A. (2012). **Handbook of Environmental Psychology**. Washington: Jhn Wiley & Sons Inc.
5. Bradby, H., (2009). **Medical Sociology: An Introduction**. London: Sage.

**COURSE TITLE: INFORMATION TECHNOLOGY AND COMMUNICATION  
SKILLS**

**COURSE CODE: ITC111**

**INTRODUCTION**

This course is designed to help students understand the social conditions that affect psychological wellbeing and to describe the process linking the social conditions to their psychological effects. The course also assists the students to develop a framework for understanding the different psychological approaches as they apply to environmental health.

**COURSE AIM**

TO equip students with knowledge and skills in basic computer system, communication and health management information system

**COURSE OBJECTIVES**

1. Describe Information Technology
2. Define hardware and software of the computer system
3. Describe communication.
4. Describe management information system
5. Explain academic writing

**COURSE LEARNING OUTCOMES**

1. Operate the computer system
2. Operate windows operating packages
3. Browse the Internet
4. Send and receive e-mails
5. Utilize electronic media in environmental practices
6. Manage data from health institutions using electronic media
7. Elucidate types of communication
8. Illustrate methods of communication
9. Illustrate communication process
10. Explain group dynamics
11. Cite authority in the text
12. Provide references in a prescribed form

**COURSE CONTENT**

**UNIT 1: INFORMATION TECHNOLOGY**

**1.1 Introduction to computers**

- 1.1.1 Definition
- 1.1.2 Characteristics of Computers
- 1.1.3 Basic Applications of Computer

## **1.2 Hardware and software**

1.2.1 Definition of Hardware

1.2.2 Definition of Software

## **1.3 Hardware components of computer system**

1.3.1 Input Devices

1.3.2 Output Devices

1.3.3 Storage Devices

1.3.4 Central Processing Unit

1.3.5 Communication Devices

## **1.4 Types of software**

1.4.1 Operating Systems

1.4.2 Application Software

1.4.3 Generalized Application Software

1.4.4 Specialized Application Software

1.4.5 Utility Software

## **1.5 Windows operating system**

1.5.1 Starting and shutting down the computer;

1.5.2 Salient features of windows (Easy to use, Faster, More reliable, and Web integration);

1.5.3 Welcome to windows XP and windows 2000 (The desktop, icon, Taskbar, and Task manager);

1.5.4 Basic mouse operations;

1.5.5 Keyboard shortcuts;

1.5.6 Navigating (Start button, my computer, Windows explorer - searching for files, and my network);

1.5.7 The windows (Application window, document window, The title bar, and Scroll bars, scroll buttons and scroll boxes);

1.5.8 Menu (Selecting a menu, Closing a menu, and Different types of menus);

1.5.9 Searching for a help topic;

1.5.10 Accessories (Word Pad, Inserting Tables, and Calculator);

1.5.11 Recycle bin; and

1.5.12 Quitting windows.

## **1.6 Internet and E-mail:**

1.6.1 Concept of internet;

1.6.2 Browsing and e-mail;

1.6.3 Logging on;

1.6.4 Send and receive email; and

1.6.5 Sending attachment.



## **UNIT 2: COMMUNICATION SKILLS**

### **2.1 Introduction to communication skills**

- 2.1.1 Definition of communication
- 2.1.2 Types of communication
- 2.1.3 Elements of communication (message, sender and receiver)
- 2.1.4 Advantages of good communication
- 2.1.5 Factors that Promote communication
- 2.1.6 Factors that hinder communication
- 2.1.7 Effective communication

### **2.2 Functions of communication:**

- 2.2.1 Entertainment; Information; Education;
- 2.2.2 Persuasion/mobilization; and
- 2.2.3 Development (social, political, economic).

### **2.3 Group dynamics**

- 2.3.1 Group dynamics in communication; and learning process.

### **2.4 Academic writing:**

- 2.4.1 Essay Writing;
- 2.4.2 Citations;
- 2.4.3 Referencing

### **2.5 Examination skills**

- 2.5.1 Preparation for examinations
- 2.5.2 Understanding active words used in examination questions

## **TEACHING METHODS**

1. Lectures
2. Practical
3. Demonstrations

## **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/laboratory work: 1 hour per week
4. Assessment and self-study: 1 hour per week

## **ASSESSMENT METHODS**

- |                                  |             |
|----------------------------------|-------------|
| <b>1. Continuous assessment:</b> | <b>40 %</b> |
| 1.1 2 Tests:                     | 20%         |
| 1.2 2 Assignments:               | 10%         |
| 1.3 Computer labwork             | 10%         |
| <b>2. Final Examinations:</b>    | <b>60%</b>  |
| 2.1 Theory:                      | 40%         |
| 2.2 Computer labwork             | 20%         |

## **PRESCRIBED READINGS**

1. Guffey, M. E. (2007). **Essentials of Business Communication**. 7<sup>th</sup> edition, Thomson Southwestern.
2. Hybels, S. & Weaver, R. (2004). **Communicating Effectively**. 7<sup>th</sup> Ed. Boston. McGraw Hill
3. Norton, P. (2002). **Introduction to Computers**. 5th Edition, Glencoe/McGraw-Hill

## **RECOMMENDED READINGS**

1. Cottrell, S. (2001). **Teaching Study Skills and Supporting Learning**. Hampshire: Palgrave Publisher,
2. Epsten, R. L. (2001). **Critical Thinking**. Victoria: Wadsworth Publisher
3. Feldman, R. S. (2000). **Power Learning: Strategies for Success in College and Life**. Boston: McGraw-Hill.

#### 14.2. FIRST YEAR SECOND SEMESTER COURSES

<b>Course code</b>	<b>Second semester of the first year</b>
HAP112	Human Anatomy & Physiology
MPP112	Microbiology, Parasitology & Pathology
FCN112	Food Chemistry & Nutrition
COH 112	Community Health
ENS112	Environmental Science
CND112	Communicable & Non-Communicable Diseases
CHP112	Community Health Practical

## **COURSE TITLE: HUMAN ANATOMY AND PHYSIOLOGY**

### **COURSE CODE: HAP112**

#### **INTRODUCTION**

The course provides a background in fundamentals of human anatomy and an understanding of the fundamentals of cellular and systems physiology.

#### **COURSE AIM**

To equip students with knowledge, skills and attitudes of human anatomy & physiology on a systems perspective as related to environmental health.

#### **COURSE OBJECTIVES**

1. Describe the structure and function of cells, including cellular metabolism and reproduction
2. Describe the structure and function of tissues and glands of various systems
3. Explain the skeleton system
4. Describe the muscular system
5. Explain blood circulatory system
6. Explain the lymphatic system
7. Describe the respiratory system
8. Describe the digestive system
9. Explain the excretory system (kidneys and skin)
10. Describe the reproductive system:
11. Describe the nervous system
12. Explain sense organs
13. Apply practical knowledge on real or assimilated objects

#### **COURSE LEARNING OUTCOMES**

1. Identify anatomical structures on models, diagrams or the human body
2. Describe the physiological functions of the human body
3. Explain various types of body systems
4. Explain major components of human body systems
5. Relate the structure of the systems to their functions
6. Elucidate the significance of the circulatory system
7. Identify various organs of the human body
8. Illustrate anatomical parts of the various organs of the human body.
9. Illustrate the muscular system by identifying different types of muscles
10. Elucidate different types of joints
11. Discuss the physiology and mechanism of respiration factors affecting or controlling respiration
12. Relate the functions body systems to the nervous systems
13. Identify the sensory organs
14. Illustrate the human reproductive system
15. Apply practical knowledge on real or assimilated objects

## **COURSE CONTENT**

### **UNIT 1: CYTOLOGY:**

- 1.1 Definition
- 1.2 Cell and its Organelles;
- 1.3 Cell division; and
- 1.4 Mitotic and meiotic.

### **UNIT 2: HISTOLOGY:**

- 2.3 Epithelial tissues, connective tissues, muscular tissues and nervous tissues; and Glands;
- 2.4 Different types, e.g. Tubular, recemosa branched.

### **UNIT 3: SKELETON SYSTEM:**

- 3.1 Structure and development of bones;
- 3.2 Different parts of the skeleton names, structure and positions of the bones forming it Ligaments;
- 3.3 Different types of joints.

### **UNIT 4: MUSCULAR SYSTEM:**

- 4.2 Muscle tissue - involuntary, voluntary and caricaturing Physiology of muscle contraction in short, explaining muscle co-ordination, fatigue
- 4.3 Names, position, origin insertion and action, of the following muscles of the Body;
  - 4.3.1 Muscles of the Heart;
  - 4.3.2 Muscles of the Neck;
  - 4.3.3 Muscles of the Thorax;
  - 4.3.4 Muscles of Respiration;
  - 4.3.5 Muscles of the Abdomen; Muscles of the Hip;
  - 4.3.6 Muscles of the Upper Limb; and
  - 4.3.7 Muscles of the lower limb adductors, gastronomies soleus, tibialis

### **UNIT 5: BLOOD CIRCULATORY SYSTEM:**

- 5.1 Composition of blood clotting - blood groups – immunity;
- 5.2 The heart and its various chambers;
- 5.3 Position, structure and function of various major component vessels of the cardiovascular tree i.e. major arteries, Arterioles, venules and veins;
- 5.4 Cardiac cycle - the basic changes involved; and
- 5.5 Principles involved in the mechanism of blood circulation, blood pressure and pulse.

### **UNIT 6: LYMPHATIC SYSTEM:**

- 6.1 Composition of lymph; Structure forming lymphatic system - lymph capillary, lymph vessels, lymph nodes;
- 6.2 Mechanism of lymph circulation; and
- 6.3 Spleen.

### **UNIT 7: RESPIRATORY SYSTEM:**

- 7.1 Organs of the respiratory system such as nose, pharynx, larynx, trachea, bronchiole bronchioles, alveoli, lungs diaphragm and paranoia sinuses; and
- 7.2 Physiology and mechanism of respiration factors affecting or controlling respiration

### **UNIT 8: DIGESTIVE SYSTEM:**

- 8.1 Organs of the digestive system, such as mouth, pharynx, oesophagus, stomach, small and large intestine, liver and pancreas;
- 8.2 Factors and stages involved in the process of digestion, such as mastication, swallowing and movements through the gastro intestinal tract, assimilation, defecation; and
- 8.3 Role of various digestive juices in the process of digestion e.g. saliva, gastric juice, pancreatic, bile, intestinal juice.

### **UNIT 9: EXCRETORY SYSTEM (KIDNEYS AND SKIN):**

- 9.1 Organs or the urinary system - Kidneys, Ureters, Urinary bladder and Urethra; and
- 9.2 Physiology of urine formation, storage and excretion structures and functions of skin.

### **UNIT 10: REPRODUCTIVE SYSTEM:**

- 10.1 Organs of the reproductive system - male and female; and
- 10.2 Menstrual cycle, Lactation

### **UNIT 11: NERVOUS SYSTEM:**

- 11.1 Brain and cranial nerves; and
- 11.2 Spinal cord (reflexes) and the peripheral nervous system

### **UNIT 12: SENSE ORGANS:**

- 12.1 Structure and functions of Eye, Ear, Nose, Tongue and Skin; and
- 12.2 Physiology of sight, hearing, taste, smell and sensations such as heat, cold, pressure

### **UNIT 13: PRACTICAL (SKILLS LABORATORY):**

- 13.1 Extensive practical on real or assimilated objects

### **TEACHING METHODS**

1. Lectures
2. Skills laboratory
3. Group discussion

### **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/laboratory work: 2 hours per week
4. Assessment and self-study: 1 hour per week

## **ASSESSMENT METHODS**

<b>1. Continuous assessment:</b>	<b>40 %</b>
1.1 2 Tests:	20%
1.2 2 Assignments:	10%
1.3 Practical:	10%
<b>2. Final Examinations:</b>	<b>60%</b>
2.1 Theory:	40%
2.2 Practical:	20%

## **PRESCRIBED READINGS**

1. Elaine, N.M. and Katia, N.H. (2015). **Anatomy and Physiology**. 10<sup>th</sup> Edition. London: Churchill Livingstone
2. Gerald, J.T. (2013). **Principle of anatomy and physiology. Atlas of skeleton set**. 8<sup>th</sup> Edition. Washington: Saunders
3. Saladi K. (2014). **Anatomy and physiology**. 5<sup>th</sup> edition. New Delhi: Jaypee brothers.

## **RECOMMENDED READINGS**

1. Frederic, A.M and Judil, N. (2014). **Fundamentals of Anatomy and Physiology**. 10<sup>th</sup> Edition. Washington: Saunders.
2. JayaranPanika, C. K. (2015). **Human physiology: An intergrated**, 3<sup>rd</sup> Edition. New Delhi: Jaypee Brothers.
3. Tortora, J. & Derrickson B. (2014). **Principles of anatomy and physiology**. 14<sup>th</sup> edition: John Wiley and Sons inc.

**COURSE TITLE: MICROBIOLOGY, PARASITOLOGY & PATHOLOGY**

**COURSE CODE: MPP112**

### **INTRODUCTION**

The course provides the students with basic knowledge and understanding of various organisms and their effects on the human body and the environment.

### **COURSE AIM**

To equip students with knowledge, skills and attitudes in microbiology, parasitology, immunology, and pathology.

### **COURSE OBJECTIVES:**

1. Describe the different types of microorganisms
2. Demonstrate knowledge on infection prevention
3. Explain the different classification of parasites
4. Describe the pathogenesis of parasitic diseases
5. Describe the factors that influence the geographical distribution of parasites
6. Identify common parasites affecting humans
7. Define pathology
8. Describe common Pathological disorders, and their management.

### **COURSE LEARNING OUTCOMES**

1. Classify the different types of microorganisms
2. Handle laboratory equipment and specimen safely.
3. Apply the knowledge acquired for use of Microbiology in Public health
4. Explain the concepts in general pathology
5. Demonstrate an understanding of pathological processes of communicable and non-communicable diseases.
6. List the various parasites that causes human disease
7. Collect water samples for microbial investigation and take appropriate action
8. Collect specimen for parasitic investigation and take appropriate action
9. Explain the diagnostic procedures in pathology
10. Discuss various causes of disease
11. Classify different types of micro-organisms
12. Discuss immune responses to parasitic infections
13. Conduct microscopic investigations for identification of various parasitic organisms
14. Illustrate the structure of bacteria and its growth
15. Classify pathological disorders
16. Discuss management of pathological disorders



## **COURSE CONTENT**

### **UNIT 1: MICROBIOLOGY**

#### **1.1 Introduction to Microbiology:**

- 1.1.1 Definition of microbiology
- 1.1.2 Historical perspective of microbiology
- 1.1.3 Classification and identification of micro-organisms
- 1.1.4 Morphology of micro-organisms in relation to bacteria
- 1.1.5 Structure of bacteria cell
- 1.1.6 Growth curves
- 1.1.7 Bacteriology, virology, mycology and immunology
- 1.1.8 Microbiology in Public Health
- 1.1.9 Physical conditions for growth and media for cultivation of micro-organisms
- 1.1.10 Sterilization and anti-microbial agents

#### **1.2 Safety and Ethics Laboratory**

- 1.2.1 Handling of equipment, and specimens in the microbiology laboratory.

#### **1.3 Microbial Physiology**

- 1.3.1 Structure of bacteria and its growth.

#### **1.4 Bacterial Pathogenicity and Host Resistance to Infection**

- 1.4.1 Basis of bacterial pathogenicity
- 1.4.2 Genetic concepts of pathogenicity
- 1.4.3 Host resistance to infection
- 1.4.4 Principles of serological diagnosis.
- 1.4.5 Microbiology in Public Health

#### **1.5 Technical Methods in Microbiology**

- 1.5.1 Collection, transportation and handling of specimens
- 1.5.2 Cultivation
- 1.5.3 Isolation and enumeration of bacteria
- 1.5.4 Sterilization
- 1.5.5 Safety in microbiology laboratory.
- 1.5.6 Antimicrobial drugs and sensitivity testing
- 1.5.7 Sterilisation and disinfection: sterilisation; disinfection; and antiseptic methods

#### **1.6 Laboratory work in microbiology**

- 1.6.1 Water microbiology.

## **UNIT 2: PARASITOLOGY**

### **2.1 Pathogenesis of Parasitic Diseases:**

- 2.1.1 Etiology;
- 2.1.2 Disease process due to parasites; and
- 2.1.3 Immunity and immune responses to parasitic infections.

### **2.2 Protozoology:**

- 2.2.1 Haemoprotozoa (plasmodium and trypanosomes);
- 2.2.2 Intestinal amoebae; and
- 2.2.3 Intestinal flagellates.

### **2.3 Helminthology:**

- 2.3.1 Nematodes;
- 2.3.2 Trematodes; and
- 2.3.3 Cestodes.

### **2.4 Laboratory Methods in Parasitology:**

- 2.4.1 Laboratory organization and safety;
- 2.4.2 Diagnostic methods; and
- 2.4.3 Quality assurance.

## **UNIT 3: PATHOLOGY**

- 3.1 Introduction to Pathology
- 3.2 Causes of diseases
- 3.3 Diagnostic procedures in pathology
- 3.4 Cell Injury, Cell death and Adaptation
- 3.5 Neoplasia (Tumours)
- 3.6 Genetics
- 3.7 Inflammation (acute and chronic inflammation)
- 3.8 Healing, Regeneration and Repair 3.9 Haemodynamic, Thrombosis and Shock.

## **TEACHING METHODS**

- 1. Lectures
- 2. Skills Laboratory
- 3. Demonstrations
- 4. Group discussions
- 5. Case studies

## **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/laboratory work: 2 hours per week
- 4. Assessment and self-study: 1 hour per week

## ASSESSMENT METHODS

<b>1. Continuous assessment:</b>	<b>40 %</b>
1.1 2 Tests:	20%
1.2 3 Assignments:	10%
1.3 Practical:	10%
<b>2. Final Examinations:</b>	<b>60%</b>
2.1 Theory:	40%
2.2 Practical:	20%

## PRESCRIBED READINGS

1. Abbas, R. (2007). **Basic pathology**. 8th edition. Washington: Saunders Elsevier.
2. Ramnik, S. (2012). **Medical Laboratory Technology**. 5rd edition. New Delhi: Jaypee brothers.
3. Roitt, B and Male, D. (2001). **Immunology**. 6th Edition. London: Mosby.

## RECOMMENDED READINGS

1. Grdon, C and Alimudlin, Z. (2003). **Manson's Tropical disease**. 21<sup>st</sup> Edtion. Washington: Elst, Saunders.
2. Jawetz, E. Melnick, J. A. (2010). **Review of Medical Microbiology**. 16th Edition. Lange ISBN: 0-87041-053-9.
3. Jayaran-Panika .C. K. (2011). **Text Book of medical Parasitology**. 4rd edition, New Delhi: Jaypee brothers.

**COURSE TITLE: FOOD CHEMISTRY AND NUTRITION**

**COURSE CODE: FCN112**

### **INTRODUCTION**

The course provides the students with basic knowledge and understanding of various nutritional components, nutritional disorders and how they are resolved in the community

### **COURSE AIM:**

To equip students with knowledge, skills and attitude to prevent and manage common nutrition related conditions in the community

### **COURSE OBJECTIVES:**

1. Define key terms in food chemistry and nutrition
2. Explain the importance of carbohydrates to human health
3. Explain the importance of proteins to human health
4. Describe the importance of lipids to human health
5. Describe the importance of vitamins to human health
6. Describe the importance of minerals to human health
7. Use the food groups to formulate mixed diets for different age groups
8. Utilise the food pyramid to plan diets for different age groups
9. Conduct nutrition education on prevention of nutritional disorders

### **COURSE LEARNING OUTCOMES:**

1. Draw the basic structures of the main nutrients
2. Provide information on the functions of various nutrients in the human body.
3. Outline the basic metabolism of the main nutrients
4. List the sources of various nutrients
5. Explain the common nutritional disorders
6. Relate a mixed diet to the prevention of nutritional disorders
7. Use the food groups to formulate mixed diets for different age groups
8. Utilise the food pyramid to plan diets for different age groups
9. Employ the daily dietary allowances to formulate a mixed diet for various age groups
10. Conduct nutrition education on prevention of nutritional disorders
11. Apply general dietary guidelines for management of common nutritional disorders and in persons with chronic conditions
12. Collect nutritional status data using common appropriate tools
13. Utilise nutritional status information to inform decision making
14. Conduct cookery demonstrations

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO FOOD CHEMISTRY AND NUTRITION**

- 1.1 Definition of common terms: food; food chemistry, and nutrition;
- 1.2 World food status: statistical records;
- 1.3 Nutrition status in Zambia: statistical records.

### **UNIT 2: CARBOHYDRATES**

- 2.1 Introduction
- 2.2 Classification and Source
- 2.3 General structure and functions
- 2.4 Digestion and absorption
- 2.5 Basic Metabolism of carbohydrates
  - 2.5.1 Dietary allowance
  - 2.5.2 Glycolysis
  - 2.5.3 Gluconeogenesis
  - 2.5.4 Glycogenolysis
  - 2.5.5 Glycogenesis; Krebs cycle (citric acid cycle);
- 2.6 Disorders of carbohydrate metabolism
  - 2.6.1 Diabetes mellitus
  - 2.6.2 Lactose intolerance
  - 2.6.3 Obesity
  - 2.6.4 Deficiency Disorders of Carbohydrates

### **UNIT 3: PROTEINS**

- 3.1 Introduction
- 3.2 General classification and Sources
- 3.3 Biochemical Classification
- 3.4 Structure and Functions
- 3.5 Digestion and absorption
- 3.6 Basic Metabolism of Proteins
  - 3.6.1 Dietary allowances
  - 3.6.2 Relationship with carbohydrates metabolism
- 3.7 Common Disorders and Deficiency of Proteins
  - 3.7.1 Kwashiorkor
  - 3.7.2 Integrated Management of Acute Malnutrition

### **UNIT 4: LIPIDS**

- 4.1 Introduction
- 4.2 General Classification and Sources
- 4.3 Structure and Functions
- 4.4 Digestion and absorption
- 4.5 Metabolism and Dietary allowances
  - 4.5.1 Linkage between Carbohydrates, Proteins, and Lipids

#### 4.6 Common disorders associated with Lipid;

4.6.1 Coronary heart disease

4.6.2 Hypercholesterolemia.

### **UNIT 5: VITAMINS**

5.1 Introduction

5.2 General Classification and Sources

5.3 Properties and Functions

5.4 Absorption

5.5 Storage

5.6 Dietary Allowances

5.7 Deficiency disorders

5.8 Vitamin Supplementation program

### **UNIT 6: MINERALS**

6.1 Introduction

6.2 General classification of minerals into major and trace minerals

6.3 Functions, Absorption, and Dietary Allowances

6.4 Common disorders

6.5 Mineral Supplementation program

6.6 Water

### **UNIT 7: APPROACHES TO MIXED DIETS:**

7.1 Introduction

7.2 Food exchange

7.3 Food grouping

7.4 Food pyramid; and

7.5 Daily Dietary Allowances

### **UNIT 8: NUTRITION IN LIFE CYCLE:**

8.1 Introduction

8.2 1000 critical days

8.3 Infant and Young Child Feeding

8.4 Option B-plus/PMTCT guidelines

8.5 School Age

8.6 Adolescents; and

8.7 Geriatrics

### **UNIT 9: COMMUNITY NUTRITION**

9.1 Introduction

9.2 Nutritional Assessment

9.3 Nutritional Surveillance

9.4 Nutrition and HIV/ Cancers

## **UNIT 10: SKILL DEVELOPMENT**

- 10.1 Introduction
- 10.2 Cookery Demonstrations
- 10.3 Gardening

### **TEACHING MATERIALS / EQUIPMENT**

- 1. Standing scales
- 2. Salter scales
- 3. Under five cards
- 4. Mid Upper Arm circumference strips
- 5. Infant and young child feeding teaching manuals
- 6. Baby Scale (newly born babies)
- 7. Pots
- 8. Cooking sticks
- 9. Plates
- 10. Measuring cups and spoons
- 11. Dessert spoons

### **TEACHING METHODS**

- 1. Lectures
- 2. Group discussions
- 3. Practical
- 4. Demonstrations
- 5. Field visits

### **NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/laboratory work: 2 hours per week
- 4. Assessment and self-study: 1 hour per week

### **ASSESSMENT METHODS**

- |                                  |             |
|----------------------------------|-------------|
| <b>1. Continuous assessment:</b> | <b>40 %</b> |
| 1.1 2 Tests:                     | 20%         |
| 1.2 2 Assignments:               | 10%         |
| 1.3 Practical                    | 10%         |
| <b>2. Final Examinations:</b>    | <b>60%</b>  |
| 2.1 Theory:                      | 40%         |
| 2.2 Practical:                   | 20%         |

## **PRESCRIBED READINGS**

1. Mahan, M.S K. (2011). Krause's **Food and Nutrition Care Process** 14<sup>th</sup> edition, Amazon
2. Ross, A. C and Caballero, B.M.D. (2012). **Modern Nutrition in Health and Disease**. Amazon.
3. Wardlaw, G.M. (2011). **Contemporary Nutrition**. 8<sup>th</sup> edition. New York: McGraw Hill
4. Whitney, N.E and Rolfes, R.S. (2012). **Understanding Nutrition**. Amazon

## **RECOMMENDED READINGS**

1. Escott, S and Stump, M.A. (2011). **Nutrition and Diagnosis Related Care**, Amazon
2. Fada, L.D.N and Pronskey M. Z. (2012). Food Medical Interactions Spinal Bound
3. Marie, B.A and Hollen H. D. (2012). **Community Nutrition in Action**, 6<sup>th</sup> edition Amazon
4. Quillin, P. (2005). **Beating Cancer with Nutrition**. Amazon
5. Whitney, N.E. (2012). **Student Course Guide, Nutrition Pathways**. Amazon



**COURSE TITLE: COMMUNITY HEALTH**

**COURSE CODE: COH112**

**INTRODUCTION**

The course is designed to equip students with knowledge, skills, and attitudes to enable them carryout comprehensive community health care services including school health. It will also provide an opportunity to students to comprehend ethical issues regarding community health and to be able to effect health promotion and preventive measures.

**COURSE AIM:**

To acquire knowledge, skills and attitude in community health practice.

**COURSE OBJECTIVES:**

1. Explain the concept of Primary Health Care
2. Describe health promotion.
3. Describe the procedure of conducting health education to the community
4. Differentiate between Health Promotion and Health Education.
5. Describe group dynamic skills in working with the community.
6. Discuss project planning and management.
7. Describe health promotion activities.
8. Describe school health services

**COURSE LEARNING OUTCOMES:**

1. Describe the concept of Primary Health Care
2. Conduct community diagnosis
3. Demonstrate understanding on the principles of health promotion
4. Demonstrate ability to conduct health education to the community
5. Provide health education in the community.
6. Network with stakeholders in promoting health.
7. Apply ethical issues in carrying out Health promotion in carrying out community activities
8. Use health education principles in communicating with the community.
9. Utilize strategies of health promotion in carrying out community health activities
10. Write project proposals to enhance health promotion activities.
11. Identify and address gender health related problems
12. Carry out health promotion activities with a gender perspective.
13. Conduct school health services
14. Plan health promotion programmes in collaboration with stakeholders.
15. Implement health promotion activities
16. Utilize strategies of health promotion in carrying out community health activities
17. Apply group dynamic skills in working with the community.

# CONTENT

## UNIT 1: PRIMARY HEALTH CARE

### 1.1 Introduction to Primary Health Care

- 1.1.1 Definition of Primary Health Care
- 1.1.2 History of Primary Health Care
- 1.1.3 Goal of Primary Health Care
- 1.1.4 Objectives of Primary Health Care

### 1.2 Principles of Primary Health Care

- 1.2.1 Accessibility (equal distribution)
- 1.2.2 Community participation
- 1.2.3 Health promotion
- 1.2.4 Appropriate technology
- 1.2.5 Inter-sectoral collaboration
- 1.2.6 Political commitment and
- 1.2.7 Equity and social justice

### 1.3 Elements of Primary Health Care

- 1.3.1 Education on prevailing health problems and control and prevention methods
- 1.3.2 Promotion of food supply and proper nutrition
- 1.3.3 Adequate supply of safe water and basic sanitation
- 1.3.4 Maternal and child health care, including family planning
- 1.3.5 Immunization against the major infectious diseases
- 1.3.6 Prevention and control of locally endemic diseases
- 1.3.7 Appropriate treatment of common diseases and injuries
- 1.3.8 Provision of essential medical drugs

### 1.4 Primary Health Care Approaches

- 1.4.1 Selective primary health care
- 1.4.2 Vertical health programs
- 1.4.3 Horizontal health programs

### 1.5 Community diagnosis

## UNIT 2: HEALTH PROMOTION

### 2.1 Health as a Concept

- 2.1.1 Definition of Health
- 2.1.2 Dimension of Health
- 2.1.3 Determinants of Health
- 2.1.4 Description of a healthy (person, family, community, nation)

### 2.2 Health Promotion as a Concept

- 2.2.1 Definition of Health promotion
- 2.2.2 Strategies of Health Promotion

- 2.2.3 Principles (Core Values) of Health Promotion
- 2.2.4 Classic examples of Health Promotion

### **2.3 The Historical Perspective of Health Promotion**

- 2.3.1 Marc Lalonde
- 2.3.2 Health promotion conferences

### **2.4 Differentiate Between Health Promotion and Health Education**

- 2.4.1 Common Terms Used In Health Promotion
- 2.4.2 Social class
- 2.4.3 Equity
- 2.4.4 Lifestyle
- 2.4.5 Stigma and Discrimination

### **2.5 Communication in Health Promotion**

- 2.5.1 Defining communication
- 2.5.2 Types of communication
- 2.5.3 Barriers to communication
- 2.5.4 Channels of communication

### **2.6 Working with Groups**

- 2.6.1 Definition of Group
- 2.6.2 Group dynamics
- 2.6.3 Leadership
- 2.6.4 Qualities of a leader
- 2.6.5 Types of leadership

### **2.7 Basics of Project Planning and Management**

- 2.7.1 Definition of project
- 2.7.2 Characteristics of project
- 2.7.3 Common terms used in the project
- 2.7.4 Project life cycle
- 2.7.5 Project proposal writing

### **2.8 Theories and Practice of Health Education**

- 2.8.1 Define Health Education
- 2.8.2 Specialized terms of Health Education
- 2.8.3 Paulo Freire and John Dewey 's theories of learning
- 2.8.4 Lesson planning

### **2.9 Ethical Issues in Health Promotion**

- 2.9.1 Selflessness
- 2.9.2 Integrity
- 2.9.3 Beneficence
- 2.9.4 Respect to life

2.9.5 Confidentiality and privacy

2.9.6 Professional Competence

## **2.10 Gender and Health**

2.10.1 Gender as a concept

2.10.2 Difference between Gender and Sex

2.10.3 Roles and Responsibilities

2.10.4 Common gender health problems

## **2.11 Emerging Health Related Issues**

2.11.1 Stress at work

2.11.2 HIV/AIDS

2.11.3 Women violence

2.11.4 Alcohol and health

2.11.5 Children's Rights

2.11.6 Prostitution

2.11.7 Streetism

2.11.8 Road Traffic Accidents

2.11.9 Early Marriages

## **2.12 The Role of Civil Society and NGOs in Promoting Health**

2.12.1 Defining of NGOs

2.12.2 Classification of NGOs

2.12.3 Advantages and Disadvantages of NGOs

2.12.4 NGO Act

2.12.5 Health activities of NGOs

## **UNIT 3: SCHOOL HEALTH SERVICES**

3.1 Concept of School Health

3.2 Components of School Health Services

3.3 Nutrition Service

3.4 Information, Education and Communication (IEC)

3.5 Accident Prevention

3.6 Health Services

3.7 Personal Health and Hygiene

3.8 Inspection of schools to assess compliance with environmental health standards

## **TEACHING METHODS**

1. Lectures

2. Practical

3. Group discussions

4. Brainstorming

5. Role play

## **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
4. Field work: 2 hours per week
5. Assessment and self-study: 1 hour per week

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS**

1. Edelman, C.L; Mandle, C.L and Kudzma, E.C. (2013). **Health Promotion throughout the lifespan**. Elsevier.
2. Laverack, G. (2004). **Health Promotion Practice (Power and Empowerment)**. London: SAGE Publication
3. Naidoo, J and Wills, J. (2009). **Health Promotion Foundations for Practice**. London: BaillierTindall

## **RECOMMENDED READINGS**

1. Barrachough, S. (2007). **Analysing Health Policy: A problem oriented Approach**. Elsevier
2. Wearner, D and Brown, B. (2000). **Helping health workers learn**. Berkely: Hesperion Foundation.
3. Hubley, J. (2008). **Communicating Health**. Oxford: Macmillan Publisher

## **COURSE TITLE: ENVIRONMENTAL SCIENCE**

**COURSE CODE: EPC112**

### **INTRODUCTION**

The course is designed to equip students with knowledge, skills, and attitudes to enable them carryout comprehensive community health care services including school health. It will also provide an opportunity to students to comprehend ethical issues regarding community health and to be able to effect health promotion and preventive measures.

### **COURSE AIM:**

To enable students acquire knowledge and skills in comprehending environmental systems/ecosystems and interactions among physical, chemical and biological components related to the environment and the impact on the biodiversity and sustainability from local and global development

### **COURSE OBJECTIVES:**

1. Analyse the environmental crisis with aid of a population, resource depletion and pollution (PRP) model
2. Describe principles of ecology and ecosystems
3. Explain the effects of population explosion on the environment and human health 4. Describe environmental and human health problems arising from resource depletion.
5. Explain the effects of pollution on the environment and human health
6. Discus the domain of Environmental Health

### **COURSE LEARNING OUTCOMES**

1. Describe Environmental Science
2. Apply the principles of environmental science to solve environmental problems
3. Elucidate environmental problems/issues
4. Explain the population, resource depletion and pollution (PRP) model
5. Analyse the scope of ecology and ecosystems
6. Describe population growth and its impact
7. Explain resource depletion
8. Define Environmental Health
9. Describe the scope of Environmental Health
10. Recognise the core components of Environmental Health.
11. Apply environmental management principles to conserve ecosystems
12. Classify resources that are being depleted globally

### **COURSE CONTENT**

#### **UNIT 1: INTRODUCTION TO ENVIRONMENTAL SCIENCE**

- 1.1 Defining Environmental Science
- 1.2 Outline of the environmental crisis: over-population; resource depletion; and pollution.
- 1.3 Population, Resource Depletion and Pollution (PRP) Model

## **2: ECOLOGY AND ECOSYSTEM**

- 2.1 Defining Ecology
- 2.2 Terms used in ecology: biosphere, biomes; ecosystems; abiotic factors; biotic factors; range of tolerance; and limiting factor.
- 2.3 Living things in ecosystems: genes, organisms, populations, and species; community; niche and habitat; and heterotrophs & autotrophs
- 2.4 Major roles of organisms in ecosystems: producers, consumers, and decomposers
- 2.5 The flow of energy through the ecosystem
- 2.6 Food chains and food webs
- 2.7 Biogeochemical cycles (nutrient cycles): the carbon cycle; the nitrogen cycle; and the phosphorous cycle
- 2.8 Interaction of organisms in ecosystem: predation, commensalism, mutualism, competition, parasitism, and neutralism.
- 2.9 Ecosystem balance and imbalance
  - 2.9.1 What keeps ecosystems stable?
    - 2.9.1.1 Population growth and environmental resistance
    - 2.9.1.2 Species diversity and ecosystem stability
  - 2.9.2 Imbalance in ecosystems
    - 2.9.2.1 Small scale changes
    - 2.9.2.2 Large scale changes
  - 2.9.3 Human impact on ecosystems
    - 2.9.3.1 Altering biotic factors
    - 2.9.3.2 Altering abiotic factors
    - 2.9.3.3 Simplifying ecosystems

## **UNIT 3: THE POPULATION EXPLOSION**

- 3.1 Natural checks on human population
- 3.2 Improving the prospects for survival
- 3.3 Carrying capacity
- 3.3 Problems of over-population
  - 3.3.1 Resource depletion e.g. food shortages, water shortages, and energy shortages
  - 3.3.2 Pollution
  - 3.3.3 Inadequate social services e.g. healthcare and education
  - 3.3.4 Overcrowding

## **UNIT 4: RESOURCE DEPLETION**

- 4.1 Food shortages
  - 4.1.1 Use fertilizers
  - 4.1.2 Use of pesticides
- 4.2 Water shortages
- 4.3 Energy source
  - 4.3.1 Impacts of energy production and consumption: coal oil, and natural gas
  - 4.3.2 Non-renewable energy resources
  - 4.3.3 Renewable energy resources

## **UNIT 5: POLLUTION**

5.1 Definition of pollution

5.2 Categories of pollution

5.3 Types of pollution: air pollution; water pollution; and soil pollution

## **UNIT 6: INTRODUCTION TO ENVIRONMENTAL HEALTH**

6.1 World Health Organisation (WHO) definition of Health

6.2 WHO definition of Public Health

6.3 WHO definition of Environmental Health

6.4 Core components of Environmental Health: Community Health; Food Safety; Occupational Health and Safety; Pollution Control; and Built Environment.

## **TEACHING METHODS**

1. Lecture
2. Practical
3. Demonstrations
4. Group discussions

## **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Assessment and self-study: 1 hour per week

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40%</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS:**

1. Chiras, D. D. (2013). **Environmental Science**. New York: Jones Bartlett Learning.
2. Enger, E.D., & Smith, B.S. (2010). **Environmental Science: A Study of Interrelationships**. New York: McGraw-Hill.
3. Wright, R.T and Boorse, D.F. (2011). **Environmental Science: Toward a Sustainable Future**. Boston: Pearson Education

## **RECOMMENDED READINGS**

1. Bassett W.H. (2004). **Clay's Handbook of Environmental Health**. London: Spon Press.
2. Colin R.T., Begon M, & Harper, J.L. (2008). **Essentials of ecology**. Oxford: Blackwell Publishing.
3. Cunningham, W.P., and Cunningham, M.A. (2011). **Principles of Environmental Science: Inquiry and Applications**. New York: McGraw-Hill.



**COURSE TITLE: COMMUNICABLE & NON-COMMUNICABLE DISEASES**

**COURSE CODE: CNC112**

**INTRODUCTION**

The course is designed to prepare students with appropriate knowledge, skills and attitudes to enable them identify and prevent and control various diseases.

**COURSE AIM:**

To apply knowledge and skills of communicable and non-communicable diseases in a professional attitude

**COURSE OBJECTIVES:**

1. Describe key concepts in communicable diseases
2. Describe signs, symptoms and prevention of communicable diseases
3. Describe signs, symptoms and prevention of non-communicable diseases
4. Outline legislation on communicable and non-communicable diseases
5. Describe neglected tropical diseases of public health importance in Zambia
6. Explain the interaction between host, agent and environmental factors in the aetiology of disease
7. Outline the process of identification, planning and implementation of disease prevention and control
8. Describe types of snails and diseases associated with them

**COURSE LEARNING OUTCOMES:**

1. Identify common signs and symptoms of communicable diseases
2. Identify common signs and symptoms of non-communicable diseases
3. Differentiate between communicable and non-communicable disease
4. Formulate a plan for disease control
5. Formulate strategies in the management of communicable diseases,
6. Formulate strategies in the prevention of communicable diseases,
7. Formulate strategies in the control of communicable diseases
8. Carry out snail survey
9. Establish the preventive measures in relation to the disease
10. Establish control measures in relation to the diseases
11. Identify neglected tropical diseases of public health importance in Zambia
12. Analyse the interaction between host, agent and environmental factors in the aetiology of disease
13. Apply strategies for implementation of disease prevention and control
14. Carry out snails survey to identify the type responsible for disease transmission
15. Apply legislation related to the control of communicable diseases

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO COMMUNICABLE DISEASES**

- 1.1 Definition of terms used in communicable and non-communicable diseases
- 1.2 Describe the disease agents: viral, bacteria, parasitic, and fungal.
- 1.3 Disease contributing factors
  - 1.3.1 Host factors: socio-economic, age, sex, nutrition, immune status: individual and herd immunity);
  - 1.3.2 Agent factors; drug resistance, load, and strain
  - 1.3.3 Environmental
  - 1.3.4 Geo-political and climatic changes.

### **UNIT 2: COMMUNICABLE DISEASES**

#### **2.1 Common communicable diseases in Zambia**

- 2.1.1 **Sexually Transmitted Diseases;** Gonorrhoea, Syphilis, Chancroid, Trichomonas Vaginalis, Lympho Granuloma Venereum, Granuloma Inguinale, and Acquired Immuno Deficiency Syndrome
  - 2.1.2 **Contagious Communicable Diseases;** Ringworms, Scabies, Leprosy, Trachoma, Conjunctivitis, Chigoes (jiggers), **Ebola, and SARRS** (Bird Flu); Acute Viral Hepatitis, Malaria, Trypanosomiasis and Tuberculosis
  - 2.1.3 **Faecal - Oral Communicable Diseases;** Poliomyelitis, Dysentery – Bacterial, and Amoebic, Cholera, Typhoid, Giardia Intestinalis, Salmonellosis, Ascariasis, Enterobiasis, Isospora belli, and Cryptosporidium Parvum
  - 2.1.4 **Childhood Immunisable communicable diseases;** Tuberculosis, Whooping cough, Diphtheria, Measles, Meningitis - Haemophilus Influenza, - Chicken pox and Small pox; and Neo-natal tetanus.
  - 2.1.5 **Communicable Diseases caused by contact with diseased animals** or their products; Rabies, Tetanus, and Anthrax.
- 2.2 **Less communicable diseases in Zambia:** Onchocerciasis; Yellow fever; Dengue fever; Plague; Typhus; Leptospirosis; and Balantidium coli.
- 2.3 **Neglected Tropical Diseases (NTDs);** Ascariasis, Hookworm, Lymphatic Filariasis, Onchocerciasis, Schistosomiasis, Trachoma, and Trichuriasis
- 2.4 **Bilharzia Control:**
- 2.4.1 Introduction to Bilharzia Control:
  - 2.4.2 Classification of Snails (Bulinus, Bulimus, and Biomphalaria):
  - 2.4.3 Species of flukes (S. Mansoni, S. Haematobium, S. Japonicum, S. Mekongi, and S. Interculatum); and
  - 2.4.4 Preventive and Control Measures:
- 2.5 **Control strategies for communicable diseases:**
- 2.5.1 The agent (disinfection, treatment);
  - 2.5.2 The transmission route;
  - 2.5.3 The host & community (treatment, isolation, quarantine, immunization); and
  - 2.5.4 The environment

### **UNIT 3: NON-COMMUNICABLE DISEASES:**

- 3.1 Diabetes Mellitus;
- 3.2 Hypertension; and
- 3.3 Lung cancers.
- 3.4 Epilepsy

### **UNIT 4: LEGISLATION ON COMMUNICABLE AND NON-COMMUNICABLE DISEASES**

- 4.1 Notifiable diseases in Zambia as per the Public Health Act CAP 295
- 4.2 International notifiable diseases as per the International Health Regulations of 2005
- 4.3 Public Health Act Cap 295 Section 9 (1)
- 4.4 Public Health (Infectious Diseases) Regulations

### **MATERIALS /EQUIPMENT**

1. Spraying equipment - various types (hudson x-pert sprayer, knapsack sprayer, polyethylene compression sprayer, stirrup/bucket type, and thermal fogger);
2. Scooping equipment (scooping spoon – scooper, and sucking pipette);
3. Rodent control equipment (traps, pesticide rotary duster, and ultrasound equipment);
4. Environmental manipulating equipment (insecticide treated blankets, insecticide treated nets, and insecticide treat blankets); and
5. Protective clothing equipment (goggles, masks, gloves, gum boots, headgear, and respirators).

### **TEACHING METHODS:**

1. Lectures
2. Practical
3. Demonstrations
4. Group discussions
5. Field trips
6. Case studies

### **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
4. Field work: 2 hours per week
5. Assessment and self-study: 1 hour per week

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. Park, K. (2011). **Prevention and Social Medicine**. New Delhi: Prem Nagar,
2. Hawker, J., Begg, N., Blair, I., Reintjes, R., and Weinberg, J. (2008). **Communicable Disease Control Handbook**. Wiley-Blackwell
3. Webber, R. (2012) **Communicable Diseases: A Global Perspective**. 4th Edition. London: Cabi.

## RECOMMENDED READINGS

1. Afubwa, S. O. and Mwanthi, M. A. (2014). **Environmental Health and Occupational Health and Safety**. Nairobi: Acrocodile Publishing.
2. Friis, R. H. (2012). **Essentials of Environmental Health**
3. Wood, C. (2008). **Community Health**. Nairobi: The African Medical and Research Foundation

## **COURSE NAME: COMMUNITY HEALTH PRACTICAL**

### **COURSE CODE: CHP112**

#### **INTRODUCTION**

The course is designed to assist students to demonstrate appropriate skills and attitudes in a rural setting arising from their classroom encounter in the first year of study.

#### **COURSE AIM**

To enable students, demonstrate skills in a rural setting where the majority of the Zambian people live.

#### **COURSE OBJECTIVES**

1. Describe the procedure of conducting community diagnosis
2. Outline the siting and construction of sanitary facilities
3. Explain various sources of water supply
4. Outline the procedure of preparing concrete mixtures used in construction
5. Outline different techniques used in rodent control.
6. Explain different strategies of malaria prevention and control
7. Explain different strategies of bilharzia prevention and control
8. Describe various approaches in child health and nutrition promotion

#### **COURSE LEARNING OUTCOMES**

1. Conduct sanitary surveys in a rural setting
2. Advise appropriate methods of human excreta and refuse disposal
3. Set up standards required planning good housing in a rural setting
4. Draw and conduct a village spraying / rodent control programme.
5. Establish different methods of water treatment in a rural setting.
6. Illustrate methods of constructing a protected well.
7. Conduct emergent water treatment in an event of an outbreak of water related disease
8. Conduct Malaria, Bilharzias and Tsetse fly surveys
9. Conduct rodent survey
10. Conduct pre-baiting and baiting procedures as part of rodent control
11. Illustrate spraying techniques during indoor residual spraying (IRS)
12. Carry out the procedure of siting of villages
13. Construct pit latrine' orifices using San – Plats
14. Conduct the process of chlorinating protected and unprotected wells
15. Conduct the procedure of taking samples from wells and surface water such as rivers, lakes, dams, etc.
16. Illustrate the procedure of siting the refuse disposal point in a rural setting

## **COURSE CONTENT**

### **UNIT 1: COMMUNITY HEALTH**

- 1.1 Develop a community diagnosis questionnaire
- 1.2 Conduct community diagnosis
- 1.3 Community diagnosis data entry
- 1.4 Community diagnosis data analysis, interpretation and presentation.

### **UNIT 2: SANITATION**

- 2.1 Site and construct ventilated improved pit latrine;
- 2.2 Site and construct ordinary pit latrine;
- 2.3 Construct a sanitary platform (SanPlat)

### **UNIT 3: WATER SUPPLY**

- 3.1 Conduct sanitary inspection of rural water supplies (community boreholes, hand dug wells and springs);
- 3.2 Participate in chlorinating hand dug wells

### **UNIT 4: BUILDING CONSTRUCTION**

- 4.1 Conduct village inspection
- 4.2 Participate in construction of houses
- 4.3 Participate in constructing appropriate technology

### **UNIT 5: RODENT CONTROL**

- 5.1 Conduct rodent survey to determine the presence of rodents and the destruction caused
- 5.2 Participate in pre-baiting and baiting of common rodents.

### **UNIT 6: MALARIA CONTROL**

- 6.1 **Conduct Malaria Survey:**
  - 6.1.1 Entomological survey; and
  - 6.1.2 Parasitological survey.
- 6.2 **Introduction to spraying techniques:**
  - 6.2.1 Residual spraying;
  - 6.2.2 Space spraying; and
  - 6.2.3 Larviciding.

### **UNIT 7: BILHARZIA CONTROL**

- 7.1 Snail survey
- 7.2 Parasitological survey
- 7.3 Application of interventions

### **UNIT 8: CHILD HEALTH AND NUTRITION**

- 8.1 Conduct growth monitoring for under five children at mother and child health clinic
- 8.2 Give health education to mothers with under five children
- 8.3 Conduct nutritional surveillance in a community

#### 8.4 Write nutritional surveillance report

##### **TEACHING METHODS**

1. Demonstrations
2. Case studies
3. Field visits
4. Practical

##### **NOTIONAL HOURS: 50 HOURS**

1. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
3. Field work: 7 hours per week
4. Assessment and self-study: 1 hour per week

##### **ASSESSMENT METHODS**

1. Student practical attachment report 40%
2. Student practical evaluation (Logbook) 60%

##### **PRESCRIBED READINGS**

1. Afubwa, S. O. and Mwanthi, M. A. (2014). **Environmental Health and Occupational Health and Safety**. Nairobi: Acrocodile Publishing.
2. Chudley, R., and Greeno, R. (2008). **Building construction handbook**. Oxford: Butterworth-Heinemann.
3. Hawker, J., Begg, N., Blair, I., Reintjes, R., and Weinberg, J. (2008). **Communicable Disease Control Handbook**. Wiley-Blackwell,

##### **RECOMMENDED READINGS**

1. Edward, A., Iano, J. (2008) **Fundamentals of Building Construction Materials and Methods**. Oxford: Butterworth-Heinemann
2. Laverack, G. (2004). **Health Promotion Practice (Power and Empowerment)**, London, SAGE Publication
3. Webber, R. (2012) **Communicable Diseases: A Global Perspective** (Modular Texts Series) 4th ed. Edition. London: Cabi.

### 13.3. SECOND YEAR FIRST SEMESTER COURSES

<b>Course code</b>	<b>First semester of the second year</b>
BUS211	Building Science
SWM211	Solid Waste Management
MER211	Medical Entomology & Rodent Control
PHA211	Public Health Administration
WAS211	Water Supply
PHL211	Public Health Law
RHP221	Rural Health Practical



## **COURSE TITLE: BUILDING SCIENCE**

### **COURSE CODE: BUS211**

#### **INTRODUCTION**

The course is intended to prepare students to undertake building designs and construction of built environment. This includes the ability to use modern drawing techniques and the enforcement of the Public Health (Building) Regulations.

#### **COURSE AIM:**

To equip students with scientific knowledge, skills and attitudes in building designs and construction of built environment.

#### **COURSE OBJECTIVES:**

1. Explain the behaviour of forces in beams and structures
2. Describe the design of appropriate building plans
3. Describe the laws and regulations related to building structures
4. Elucidate the behaviour of forces in beams
5. Describe the process of scrutiny of building plans.
6. Describe different faults and defects of building structures in accordance with the Public Health Act CAP 295.
7. Explain Public Health (Building) Regulations.

#### **COURSE LEARNING OUTCOMES:**

1. Explain the behaviour of forces in beams and structures
2. Illustrate design of appropriate building plans.
3. Interpret laws and regulations regarding building structures.
4. Advise on appropriate materials for construction of building structures.
5. Demonstrate ability to use modern drawing techniques.
6. Enforce Public Health CAP 295 (Building Regulations).
7. Identify different faults and defects of building structures in accordance with the Public Health Act CAP 295 (Building Regulations) and make appropriate recommendations
8. Scrutinize building plans and make appropriate recommendations
9. Enforce principles of Town and Country Planning practices to manage land use
10. Identify gaps in land use and take appropriate action
11. Relate the behaviour of forces in beams to building stability
12. Draw building plans for dwelling houses
13. Inspect dwellings houses to ascertain their suitability for human habitation

#### **COURSE CONTENT**

##### **UNIT 1: BUILDING MECHANICS**

- 1.1. Beams
- 1.2. Stress, Strain and Elasticity
- 1.3. Forces moving about point, and beams

- 1.4. Shear force and Bending moments
- 1.5. Cantilever beams

## **UNIT 2: BUILDING GEOMETRY AND TECHNICAL DRAWING**

- 2.1 **Introduction to technical drawing**
- 2.2 **Principles of technical drawing**
  - 2.2.1 Accuracy
  - 2.2.2 Thoroughness
  - 2.2.3 Neatness
  - 2.2.4 Completeness
- 2.3 **Identification and use of drawing equipment**
- 2.4 **Mechanical Drawing**
  - 2.4.1 Outlines
  - 2.4.2 Title block
  - 2.4.3 Lettering
  - 2.4.4 Dimensioning
  - 2.4.5 Isometric and Orthographic drawing
- 2.5 **Plans, Elevations and Sections**
  - 2.5.1 Dwelling houses
  - 2.5.2 Trading premises
  - 2.5.3 Public buildings

### **2.6 Introduction to Auto-CAD software**

## **UNIT 3: TOWN AND COUNTRY PLANNING**

- 3.1 **Brief history of the development of Town and Country Planning**
  - 3.1.1 Factors that led to development of Town and Country Planning discipline
- 3.2 **Institutional and legal frameworks for Town and Country Planning in Zambia**
  - 3.2.1 Institutional framework for Town and Country Planning in Zambia
  - 3.2.2 Laws and Regulations that guide Town and Country Planning practice in Zambia
- 3.3 **Principles of Town and Country Planning practices**
- 3.4 **Developmental control**
  - 3.4.1 Development plan,
  - 3.4.2 Zoning principles,
  - 3.4.3 Change of land use and
  - 3.4.4 Planning permission
- 3.5 **Development strategies and their shortcomings**

- 3.5.1 Top-down approach
- 3.5.2 Bottom-up approach – decentralization

### **3.6 Rural and urban growth**

- 3.6.1 Definition of urban drift
- 3.6.2 Causes and results of urban drift – health and social
- 3.6.3 Development of informal settlements – causes and impacts on towns and cities
- 3.6.4 Concept of upgrading informal settlements and Urban Renewal

### **MATERIALS /EQUIPMENT**

- 1. Drawing boards
- 2. T-squares
- 3. Technical drawing instruments

### **TEACHING METHODS:**

- 1. Group discussions
- 2. Lectures
- 3. Demonstrations
- 4. Practical
- 5. Field visits

### **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 3 hours per week
- 3. Assessment and self-study: 1 hour per week

### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCRIBED READINGS**

- 1. Chudley, R., and Greeno, R. (2008) **Building construction handbook**, ButterworthHeinemann, Oxford.
- 2. Edward, A., Iano, J. (2008) **Fundamentals of Building Construction Materials and Methods**. Oxford: Butterworth-Heinemann

3. Frederick, S.M., and Ricketts, J.T. (2010) **Building Design and Construction Handbook**, McGraw-Hill Professional.

#### **RECOMMENDED READINGS**

1. Blankenbaker, E.K. (2013) **Construction and building technology**, The Goodheartwillcox, company, Illinois
2. Chudley, R., and Greeno, R. (2008) **Construction technology**, Amsterdam: Pearson Prentice Hall.
3. Pohl, J. (2011) **Building science: concepts and application**. West Sussex; Willey-Blackwell

**COURSE TITLE: SOLID WASTE MANAGEMENT**

**COURSE CODE: SWM211**

### **INTRODUCTION**

The course forms the basis for helping the students understand solid waste management health theories, concepts and practices. It also equips the students with knowledge, skills and attitudes to enable them to conduct the hazardous and electronic waste management.

### **COURSE AIM**

To enable students acquire knowledge and skills in Solid Waste Management.

### **COURSE OBJECTIVES**

1. Describe key concepts in solid waste management
2. Explain sources, types and composition of solid wastes
3. Describe various methods used in the collection of waste from domestic houses
4. Elucidate the principles of solid waste management
5. Describe methods of transportation and disposal of solid waste
6. Describe the storage and disposal of hazardous waste
7. Describe the electronic waste

### **COURSE LEARNING OUTCOMES**

1. State legal and institutional framework for solid waste management in Zambia
2. Enforce solid waste management legislation.
3. Identify international Conventions and treaties on solid waste management
4. Describe solid waste management guiding principles
5. Illustrate integrated solid waste management
6. Monitor types and sources of solid waste being generated in a town.
7. Characterize solid wastes.
8. Identify functional elements of a solid waste management.
9. Evaluate solid waste handling and separation, storage and processing at the source
10. Enumerate various methods of solid waste collection
11. Recommend solid waste segregation, processing, transformation and recovery methods
12. Establish solid waste transfer and transport system for a town
13. Set up a final disposal method of solid wastes
14. Manage hazardous waste
15. Manage electronic waste

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO SOLID WASTE MANAGEMENT**

- 1.1 Definition of key concepts in solid waste management; solid waste and solid waste management.
- 1.2 Effects of improperly disposed of solid wastes on human health and the environment
- 1.3 Legal and institutional framework for solid waste management in Zambia
- 1.4 International Conventions and treaties on solid waste management: Basel Convention; Bamako Convention; Stockholm Convention; and Agenda 21.
- 1.5 Solid waste management guiding principles: the “polluter pays” principle; the “precautionary” principle; the “duty of care” principle; the “principle of cooperation”; the “proximity” principle; the cradle-to-grave principle; and integrated life cycle principle
- 1.6 Integrated solid waste management: source reduction; recycling; waste transformation; and landfilling

### **UNIT 2: SOURCES, TYPES AND COMPOSITION OF SOLID WASTES**

- 2.1 Introduction
- 2.2 Sources and types of solid waste
- 2.3 Composition of solid wastes

### **UNIT 3: SOLID WASTE MANAGEMENT SYSTEM**

- 3.1 Functional elements of a solid waste management system: solid waste generation; solid waste handling and separation, storage and processing at the source; solid waste collection; solid waste segregation, processing, transformation and recovery; solid waste transfer and transport; and Final disposal of solid wastes.
- 3.2 Solid waste generation:
  - 3.2.1 Solid waste quantities
  - 3.2.2 Solid waste generation and collection rates
  - 3.2.3 Factors affecting solid waste generation rates
  - 3.2.4 Solid waste characterization/analysis
- 3.3 Solid waste handling and separation, storage and processing at the source:
  - 3.3.1 Solid waste handling at source
  - 3.3.2 Solid waste storage at the source
  - 3.3.3 Processing of solid waste at the source
- 3.4 Solid waste collection:
  - 3.4.1 Solid waste collection methods
    - 3.4.1.1 Curb-side collection
    - 3.4.1.2 House-to-house collection
    - 3.4.1.3 Hauled container system
    - 3.4.1.4 Stationary container system
  - 3.4.2 Factors affecting collection schedule (season of the year, geographical position, type of waste, culture of the people, use of grinders)

- 3.5 Solid waste segregation, processing, transformation and recovery:
  - 3.5.1 Solid waste segregation
  - 3.5.2 Solid waste processing and transformation
  - 3.5.3 Solid waste recovery
- 3.6 Solid waste transfer and transport:
  - 3.6.1 Solid waste transfer
  - 3.6.2 Need for transfer operation
  - 3.6.3 Types of transfer stations
  - 3.6.4 Solid waste transport
    - 3.6.4.1 Mechanical transport (side loaders, dual tippers, hook lifters, compactors, moving vehicles, and barriers loaders);
    - 3.6.4.2 Non-mechanized transport (wheel barrows, ox-driven wagons, and push carts).
- 3.7 Final disposal of solid wastes
  - 3.7.1 Refuse pits
  - 3.7.2 Open dumping
  - 3.7.3 Compositing
  - 3.7.4 Incineration (waste to energy)
  - 3.7.5 The landfill method of solid waste disposal
    - 3.7.5.1 Landfill classification, types and methods;
    - 3.7.5.2 Landfill siting consideration;
    - 3.7.5.3 Composition and characteristics of landfill gases;
    - 3.7.5.4 Generation, movement and control of landfill gases;
    - 3.7.5.5 Composition, formation, movement and control of leachate in landfills;
    - 3.7.5.6 Landfill operations;
    - 3.7.5.7 Landfill closure and post closure care.

#### **UNIT 4: HAZARDOUS WASTES**

- 4.1 Introduction
- 4.2 Classification of hazardous wastes
- 4.3 Effects of hazardous wastes on human health and the environment
- 4.4 Management of hazardous wastes

#### **UNIT 5: MANAGEMENT OF ELECTRONIC WASTE**

- 5.1 Introduction
- 5.2 Effects of electronic waste on human health and the environment
- 5.3 Management of electronic waste

#### **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Field work: 2 hours per week
- 4. Assessment and self-study: 2 hours per week

## TEACHING METHODS

1. Lectures
2. Practical
3. Group discussions
4. Demonstrations
5. Field trips

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40%</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.1 Practical	20%

## PRESCRIBED READINGS

1. Tchobanoglous, G., and Kreith, F. (2002). **Handbook of Solid Waste Management**. New York: McGraw-Hill Companies.
2. Tchobanoglous, G., Theisen, H., Vigil, A.S. (2004). **Integrated waste management: engineering principles and management issues**. New York: McGraw-Hill.
3. UNEP (2005). **Solid Waste Management**. Geneva: CalRecovery, Inc.

## RECOMMENDED READINGS

1. Cheremisinoff, N.P. (2003). **Handbook of Solid Waste Management and Waste Minimization Technologies**. Amsterdam: Butterworth-Heinemann.
2. The International Bank for Reconstruction and Development / The World Bank (2008). **Improving Municipal Solid Waste Management in India: A Sourcebook for Policy Makers and Practitioners**. Washington: The World Bank.
3. World Health Organisation (2005). **Management of solid health-care waste at primary health care centers: decision making guide**. Geneva: World Health Organisation Press.



**COURSE TITLE: MEDICAL ENTOMOLOGY AND RODENT CONTROL**

**COURSE CODE: MER211**

### **INTRODUCTION**

This course introduces the students to the necessary knowledge and skills in the control of arthropods and rodents of medical importance. It will also enable the students to utilise appropriate measures in the control of vectors and rodents.

### **COURSE AIM**

To equip students with necessary knowledge and skills in the control of arthropods and rodents of medical importance

### **COURSE OBJECTIVES**

1. Discuss anatomy and life cycle of arthropods of medical importance
2. Apply appropriate interventions used to prevent and control epidemics of vector borne diseases.
3. Apply appropriate interventions used in in the prevention and control of malaria
4. Apply procedures of rodent control in the implementation of interventions for proper management of rodent borne diseases
5. Apply principles of fumigation and legislative framework in conducting fumigation process and spraying techniques for control of vector and rodent borne diseases
6. Describe the legislation on medical entomology and rodent control in Zambia

### **COURSE LEARNING OUTCOMES**

1. Conduct Spraying techniques in the control of vectors
2. Distinguish Synanthropic rats from mice
3. Conduct rodent survey
4. Identify eggs and larvae from breeding sites
5. Explain modes of transmission for vector and rodent borne diseases
6. Apply control methods to prevent and control epidemics of vector and rodent borne diseases.
7. Differentiate various types of arthropods
8. Use various survey methods to catch vectors
9. Identify snails carrying schistosoma parasites
10. Conduct snail survey
11. Carry out spraying techniques to eliminate snails carrying schistosoma parasites

### **COURSE CONTENT**

#### **UNIT 1: MEDICAL ENTOMOLOGY**

- 1.1 Introduction
- 1.2 Definition of terms

- 1.3 Classification of arthropods
- 1.4 Common arthropods of medical importance (Mosquito, House fly, Cockroach, Black fly, Fleas, Mites, Ticks, Lice, Bedbugs and Tsetse fly)
- 1.5 Basic anatomy of arthropods of medical importance
- 1.6 Life cycles of arthropods of medical importance

## **UNIT 2 VECTOR CONTROL**

- 2.1 Vector Status (Affinity, Susceptibility, and Longevity);
- 2.2 Methods of disease transmission (Mechanical transmission, Biological transmission and Transovarian Transmission);
- 2.3 Prevention and control Methods for Vectors (Chemical control, Biological Control, Source reduction, Integrated vector management (IVM), and Person protection)
- 2.4 Chemical Resistance (Behavior resistance, Vigor resistance, Physiological resistance)

## **UNIT 3: MALARIOLOGY**

- 3.1 Introduction to Malariology (Definition and Background)
- 3.2 Lifecycle of Malaria parasite in man and mosquito;
- 3.3 Symptoms and signs of malaria;
- 3.4 Management of Malaria (Uncomplicated Malaria, Complicated Malaria, and Intermittent Preservative Treatment - I.P.T); Malaria control Interventions (Indoor Residual Spraying – IRS, Insecticide Treated Nets – ITN, Larval Control, and Environmental Management - Modification, and Manipulation);
- 3.5 Zoning concept (Free Zone, Buffer zone, and Protective zone).

## **UNIT 4: RODENT CONTROL**

- 4.1 Introduction
- 4.2 Classification and grouping of rodents;
- 4.3 Common species of rodents;
- 4.4 Diseases caused by rodents (Plague, Salmonellosis, Rabies, and Murine typhus);
- 4.5 Rodent surveillance and control programmes in public places (markets, airports, houses, public buildings and silo establishments);
- 4.6 Safety precaution in rodenticide usage;
- 4.7 Groups of rodenticides;

## **UNIT 5: FUMIGATION PROCESS**

- 5.1 Definitions of terms used in fumigation (Fumigant, fumigator, Grains, Silo operator)
- 5.2 Selection of fumigants;
- 5.3 Application equipment and protective equipment;
- 5.4 Fumigation by Pest Control operators;
- 5.5 Safety and health precautions; and first - aid kit.

## **UNIT 6: LEGISLATION ON MEDICAL ENTOMOLOGY AND RODENT CONTROL IN ZAMBIA**

- 6.1 Public Health Act Cap 295 sect 34 and 67 (1) and (j);
- 6.2 Public Health Act (infections disease) Regulations 34, 57 and 58;

### 6.3 WHO International Health Regulations (2005) and other International conventions

#### **TEACHING MATERIALS /EQUIPMENT**

1. Spraying equipment - various types (Hudson X-pert sprayer, knapsack sprayer, polyethylene compression sprayer, stirrup/bucket type, and thermal fogger);
2. Scooping equipment (scooping spoon – scooper, and sucking pipette);
3. Rodent control equipment (traps, pesticide rotary duster, and ultrasound equipment);
4. Environmental manipulating equipment (insecticide treated blankets, insecticide treated nets, and insecticide treat blankets); and
5. Protective clothing equipment (goggles, masks, gloves, gum boots, headgear, and respirators).

#### **TEACHING METHODS**

1. Lectures
2. Practical
3. Field visits
4. Demonstrations
5. Group discussions

#### **NOTIONAL HOURS: 90 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/Laboratory work: 1 hour per week
3. Field work: 1 hours per week
4. Assessment and self-study: 1 hour per week

#### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

#### **PRESCRIBED READINGS**

1. Mullen, G and Durden, L. (2002). **Medical and Veterinary Entomology**. Amsterdam: **Academic Press**.
2. The Malaria Consortium (2007). **Malaria Hand Book for Health Professionals**, London: Macmillan Publishers Ltd.

3. World Health Organisation (2006). **Pesticides and their Application, for the control of Vectors and Pests of Public Health Importance**. Geneva: WHO Press.

#### **RECOMMENDED READINGS**

1. Lehan, M. (2005). **The Biology of Blood Sucking Insects**, London: Cambridge University Press
2. Service, M.W. (2001). **The encyclopaedia of arthropod transmitted infections of man and domesticated animals**, Wallingford: CABI
3. Service, M.W. (2008). **Medical entomology for students**. London: Cambridge University Press

**COURSE TITLE: PUBLIC HEALTH ADMINISTRATION**

**COURSE CODE: PHA211**

### **INTRODUCTION**

This course introduces the students to management concepts and skills in the health care system. Emphasis will be placed on the management of health services as well as the financial resources and records management systems.

### **COURSE AIM**

To equip the students with knowledge and skills in management of health services, financial resources and records.

### **COURSE OBJECTIVES:**

1. Describe the organisation of health services in Zambia
2. Discuss office organisation and administration
3. Explain financial resources management
4. Describe the historical development of health services in Zambia.
5. Describe the organizational structure.
6. Describe the health services in other countries.
7. Explain the importance of team work in a health centre for proper functioning of the health care and its activities.
8. Describe the procedures in the management of finances.
9. Explain the importance of maintaining records in health facilities

### **COURSE LEARNING OUTCOMES**

1. Presents diagrammatically organization of health services in Zambia.
2. Demonstrates understanding of the Zambian health system.
3. Appreciates health systems in other countries
4. Implements measures that are feasible, practical and cost effective.
5. Applies accounting principles and policies.
6. Implements institutional policies on finance management
7. Plans budgets, account for cash and fixed assets.
8. Implements budgets.
9. Account for cash.
10. Produces reports.
11. Develops a filing system for a facility
12. Conducts oneself in an acceptable manner as a health professional
13. Carries out stock evaluation and procure goods and services
14. Maintains records in health facilities
15. Work as an integrated health team
16. Register fixed assets

## **COURSE CONTENT**

### **UNIT 1: HEALTH SERVICES IN ZAMBIA**

#### **1.0 Introduction:**

- 1.0.1 Definition of health;
- 1.0.2 Historical development of health services in Zambia;
- 1.0.3 Health reforms; and
- 1.0.4 The traditional attitude of health towards Modern concept.

#### **1.1 Organization Structure:**

- 1.1.1 National level;
- 1.1.2 Provincial level;
- 1.1.3 District level;
- 1.1.4 Local community level; and
- 1.1.5 Other health providers and their roles.

#### **1.2 Health Services in other Countries:**

- 1.2.1 Comparison of Health Services Provision in other countries and for each system to give advantages and disadvantages.

#### **1.3 Introduction to Professional conduct**

- 1.3.1 Professional conduct
- 1.3.2 Health worker as a role model;
- 1.3.3 Ethics; and
- 1.3.4 Code of conduct for Environmental Health Professionals as ‘Authorized Officers’.

### **UNIT 2: OFFICE ORGANISATION AND ADMINISTRATION**

#### **2.1 Management Techniques:**

- 2.1.1 Principles of administration;
- 2.1.2 Staff management and personal relationship;
- 2.1.3 Terms and conditions of service; and
- 2.1.4 Confidential reports and staff records.

#### **2.2 Department Organization (Structure and functions):**

- 2.2.1 Central government;
- 2.2.2 Local government;
- 2.2.3 Local Authorities;
- 2.2.4 Scope of environmental health section; and
- 2.2.5 Delegation of responsibilities and specialization.

#### **2.3 Vehicles:**

- 2.3.1 Care and maintenance;
- 2.3.2 Mileage costing; and
- 2.3.3 Log books and mileage returns.

## **2.4 Stores and Equipment:**

- 2.4.1 Procedure for ordering, care and maintenance of equipment; and
- 2.4.2 Records and inventories-including expendable and non-expendable.

## **2.5 Records and Returns:**

- 2.5.1 Daily dairies;
- 2.5.2 Weekly, monthly quarterly report;
- 2.5.3 Annual reports;
- 2.5.4 Infections and fortifiable disease returns; and
- 2.5.5 Others – public cleansing, malaria control, rodent control, meat inspection etc.

## **2.6 Filing Systems and Registers:**

- 2.6.1 Registers (In-coming, Out-going mail nuisance, Meat inspection, hotels, Dairies etc);
- 2.6.2 Filing (Types of filing systems, Methods, and Reference).

## **2.7 Statutory Procedures:**

- 2.7.1 Council and committee proceedings;
- 2.7.2 Reports to committee and council;
- 2.7.3 Preparation of statutory notice; and
- 2.7.4 Legal action.

## **UNIT 3: FINANCIAL RESOURCES MANAGEMENT**

- 3.1 Definition of accounting and finance
- 3.2 Users of accounting information
- 3.3 Types of businesses
- 3.4 Types of organisational structures
- 3.5 Basic principles of accounting
- 3.6 Accounting assumptions
- 3.7 **System of reporting**
  - 3.7.1 Single entry system
  - 3.7.2 Double entry system
- 3.8 Basis of accounting
- 3.9 Classification of accounts: liabilities; assets; revenue; expenses; and equity
- 3.10 **Budgeting**
  - 3.10.1 Flexible; ZBB; Incremental budget models
  - 3.10.2 Budgeting cycle
- 3.11 **Stock/Inventory Management**
  - 3.11.1 Types of stock
  - 3.11.2 Stock cycle
  - 3.11.3 LIFO; FIFO; AVCO
- 3.12 **Procurement**
  - 3.12.1 Role of the tender committee
  - 3.12.2 Composition of the tender committee
  - 3.12.3 Tender process

- 3.13 **Human Resources Management**
  - 3.13.1 Definition
  - 3.13.2 Responsibilities
  - 3.13.3 Staff payroll administration
- 3.14 **Bank Reconciliations**
  - 3.14.1 Definition
  - 3.14.2 Presented/Unpresented cheques; Bank interests
- 3.15 **Financial Reporting**
  - 3.15.1 Income Statement
  - 3.15.2 Monthly/Quarterly Reports (Income and Expenditure)

### **NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Field work: 1 hours per week
- 4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

- 1. Lectures
- 2. Tutorials
- 3. Group discussions
- 4. Demonstrations
- 5. Problem based learning

### **CONTACT HOURS: 64 HOURS**

- 1. Lectures: 2 hours per week
- 2. Tutorials 2 hours per week

### **ASSESSMENT METHODS**

- |                                 |             |
|---------------------------------|-------------|
| <b>1. Continuous assessment</b> | <b>40 %</b> |
| 1.1 2 Tests                     | 30%         |
| 1.2 2 Assignments               | 10%         |
| <br>                            |             |
| <b>2. Final Examinations</b>    | <b>60%</b>  |
| 2.1 Theory                      | 60%         |

### **PRESCRIBED READINGS**

- 1. Bower, D (2003). **Management of Procurement**. Thomas Telford Ltd
- 2. Swayne, Linda E. Duncan, W. Jack; Ginter, Peter M. (2008) **Strategic Management of Health Care Organizations**, Cambridge: Blackwell Publishers
- 3. World Health Organisation (2005) **Strengthening management in low-income countries: lessons from Uganda**, Geneva: WHO Press.



## **RECOMMENDED READINGS**

1. World Health Organisation (2006) **Improving Health Services and strengthening health systems**, Geneva: WHO Press,
2. World Health Organisation (2007) **towards better leadership and management in health**, Geneva: WHO Press.
3. World Health Organisation (2008) **Economics and financial management: what do district managers need to know?** Geneva: WHO Press.

**COURSE TITLE: WATER SUPPLY****COURSE CODE: WAS211****INTRODUCTION**

The course will enable the students to demonstrate requisite knowledge and skills in the management of rural and urban water supply in Zambia.

**COURSE AIM**

To enable students demonstrate the knowledge, skills and attitudes in rural and urban water supply in Zambia.

**COURSE OBJECTIVES**

1. Explain the key concepts used in water supply.
2. Describe the various sources of drinking water
3. Categorise the three types of drinking water quality parameters.
4. Describe measures for protection of rural water supply sources
5. Describe the various stages of a conventional water treatment plant
6. Elucidate household water treatment and safe storage methods

**COURSE LEARNING OUTCOMES**

1. Describe the concepts used in water supply.
2. Categorise diseases associated with water in for categories
3. Describe five quantitative service level indicators for water supply
4. Interpret the legal and institutional frameworks for water supply in Zambia
5. Explain the hydrological cycle
6. Identify various water supply sources and technologies.
7. Categorise water supply technologies
8. Recommend appropriate measures for protection of rural water supply sources.
9. Explain the three types of drinking water quality parameters.
10. Describe the various stages of a conventional water treatment plant
11. Explain three common types of water distribution systems
12. Evaluate methods of supplying water
13. Describe measures you can take to prevent contamination of water distribution systems
14. Demonstrate the knowledge of household water treatment methods
15. Explain the importance of safe storage
16. Conduct sanitary inspections of water sources to establish their suitability for use

## **COURSE CONTENT**

### **WATER SUPPLY**

#### **UNIT 1: INTRODUCTION TO WATER SUPPLY**

- 1.1 Definition of concepts used in water supply; water, supply, and water supply.
- 1.2 Classification of diseases association with water: water-borne diseases; water based diseases; water related diseases; and water washed diseases.
- 1.3 Qualitative service level indicators: quality; quantity; continuity; accessibility; acceptability; and affordability.
- 1.4 Legal and institutional framework for water supply in Zambia

#### **UNIT 2: SOURCES OF WATER**

- 2.2 Hydrological cycle
- 2.3 Sources of water: groundwater; surface water; and precipitation (rainfall).
- 2.4 Categories of water technologies.
  - 2.4.1 Unimproved water sources (unprotected dug well; unprotected spring; cart with small tank or drum provided by water vendor; tanker truck provision of water; surface water; and bottled water).
  - 2.4.2 Improved water sources (piped water into dwelling, yard or plot, public tap or standpipe; tubewell or borehole; protected dug well; protected spring; and rainwater collection).

#### **UNIT 3: WATER QUALITY PARAMETERS**

- 3.1 Physical parameters: turbidity, taste, odour, colour and electrical conductivity.
- 3.2 Chemicals parameters: Nitrate, Arsenic, Lead, Fluoride, Iron and Manganese, Aluminium, pH, Residue chlorine, Total Hardness and Pesticides.
- 3.3 Microbiological parameters: indicator microorganisms; E.coli, faecal coliforms and total coliforms.

#### **UNIT 4: PROTECTION OF RURAL WATER SUPPLY SOURCES**

- 4.1 Hand dug wells with windlass
- 4.2 Boreholes with a hand pump
- 4.3 Springs
- 4.4 Rain water harvesting

#### **UNIT 5: CONVENTIONAL WATER TREATMENT AND DISTRIBUTION**

- 5.1 Significance of water treatment
- 5.2 Siting of water treatment plants
- 5.3 Water treatment units
  - 5.3.1 Water intake structures
  - 5.3.2 Preliminary treatment

- 5.3.3 Coagulation and flocculation
- 5.3.4 Sedimentation
- 5.3.5 Filtration
- 5.3.6 Disinfection
- 5.3.7 Clear water well
- 5.4 Water distribution
- 5.5 Types of water distribution systems
  - 5.5.1 Gravity system,
  - 5.5.2 Pumping system
  - 5.5.3 Mixed gravity and pumping system
- 5.6 Systems of supplying water
  - 5.6.1 Constant supply
  - 5.6.2 Intermittent supply
- 5.7 Prevention of contamination in the water distribution systems

## **UNIT 6: HOUSEHOLD WATER TREATMENT AND SAFE STORAGE METHODS**

- 6.1 Introduction
- 6.2 Household water treatment methods: boiling; point of use chlorination; biosand filtration; solar disinfection; three pot system; cloth filtration; and ceramic filtration
- 6.3 Safe storage

### **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/Laboratory work: 1 hour per week
- 3. Field work: 1 hours per week
- 4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Field visits
- 4. Group discussions
- 5. Demonstrations

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40%</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. Rangwala, S.C., (2015). **Water supply and sanitary engineering**. Gujarat: Charotar Publishing House.
2. World Health Organization (2011). **Guidelines for drinking-water quality**. Geneva: WHO Press.
3. World Health Organization and IRC Water and Sanitation Centre (2003). **Linking technology choice with operation and maintenance in the context of community water supply and sanitation**. Geneva: WHO Press.

## RECOMMENDED READINGS

1. World Health Organization (2003). **Assessing microbial safety of drinking water**. Geneva: WHO Press.
2. World Health Organization (2007) **Chemical safety of drinking water: assessing priorities for risk management**. Geneva: WHO Press.
3. World Health Organization (2011) **Evaluating household water treatment options, health-based targets and microbiological performance specifications**. Geneva: WHO Press.

**COURSE TITLE: PUBLIC HEALTH LAW****COUSE CODE: PHL211****INTRODUCTION**

This course assists the students to develop a framework for understanding the basic principles of Law. The students will also acquire an understanding of appropriately applying the legal aspects with regard to health related statutes.

**COURSE AIM:**

To equip students with appropriate knowledge and skills in basic principles of Law

**COURSE OBJECTIVES**

1. Describe principles of law
2. Describe prosecution procedures
3. Elucidate the principles of law in Zambia
4. List the sources of Zambian Law.
5. State the Zambian constitution in relation to other Laws in Zambia.
6. Describe court procedure in Civil and Criminal Actions.
7. Differentiate between Tort Law and Criminal Law.
8. Describe the powers of an ‘authorized officer’ in the context of executing public health laws
9. Explain the limitations of the powers of a statutory officer.
10. Explain the acceptability of foreign laws vis-à-vis laws and decisions passed in Commonwealth Countries

**COURSE LEARNING OUTCOMES**

1. Apply the principles of law in executing public health functions
2. Identify various sources of Zambian law
3. Use correct legal procedures when taking actions as well defending legal proceeding when need arises.
4. Provide evidence that is admissible in a court of law
5. Execute powers as a statutory officer
6. Describe the criminal procedure code as the basis for criminal proceeding.
7. Institute legal proceeding in both civil and criminal cases
8. Interpret statutes related to public health
9. Elucidate the acceptability of foreign laws vis-à-vis laws and decisions passed in the Commonwealth Countries;
10. Demonstrate an understanding of how various laws are related in executing public health activities
11. Differentiate between tort and criminal law
12. Relate persuasive law with Zambian law and how they are applied
13. Apply court procedure in Civil and Criminal Actions
14. Relate the Zambian constitution to other Laws in Zambia in terms applicability
15. Use weight of evidence to prosecute the offender in court of law

## **COURSE CONTENT**

### **UNIT 1.0 PRINCIPLES OF**

#### **1.0 LAW**

##### **1.1 Constitutional Law:**

- 1.1.1 Sources of Zambian Law;
- 1.1.2 The Zambian Constitution
- 1.1.3 The Constitution in relation to other laws in Zambia;
- 1.1.4 The Judicature system in Zambia;
- 1.1.5 Zambian applied laws and acceptability of Foreign laws vis-à-vis laws and decisions passed in Commonwealth countries;
- 1.1.6 Applicability of African customary law
- 1.1.7 Case law

##### **1.2 Legal Process:**

- 1.2.1 Court procedures in civil and criminal actions;
- 1.2.2 The law of evidence;
- 1.2.3 Competence and compellability of witnesses;
- 1.2.4 Relevance and weight of evidence, particularly from experts such as Environmental Health Technologists; and
- 1.2.5 Case law
- 1.2.6 General defences at Law.

##### **1.3 Criminal Law:**

- 1.3.1 Definition of Crime
- 1.3.2 Elements of a crime
- 1.3.3 Classification of crimes
- 1.3.4 Case law
- 1.3.5 Defences in criminal law

##### **1.4 The Law of Torts:**

- 1.4.1 Definition of the law of torts
- 1.4.2 Difference between tort and criminal law
- 1.4.3 Elements of a tort
- 1.4.4 Classification of torts
- 1.4.5 General principles of liability in Tort
- 1.4.6 Types of liability
- 1.4.7 Case law
- 1.4.8 Defences in tort law

##### **1.5 Health related statutes**

- 1.5.1 The Public Health Act, CAP 295 of the Laws of Zambia
- 1.5.2 The Standards act cap 416
- 1.5.3 The Animal Health Act no.27 of 2010

- 1.5.4 The Town and Country Planning Act
- 1.5.5 The Occupational health and Safety Act of 2010 of the Laws of Zambia
- 1.5.6 The Food and Drugs Act, CAP 303 of the Laws of Zambia
- 1.5.7 The Liquor Licensing Act, CAP 167 of the Laws of Zambia
- 1.5.8 The Zambia Environmental Management Act CAP of the Laws of Zambia
- 1.5.9 The Factories Act, CAP 441 of the Laws of Zambia
- 1.5.10 The Criminal procedure code Cap 87 of the Laws of Zambia
- 1.5.11 Statutory instruments
- 1.5.12 Persuasive Laws

### **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Seminar: 1 hour per week
- 3. Field work (Court session): 2 hours per week
- 4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

- 1. Lectures
- 2. Tutorials
- 3. Field visits (Court sessions)
- 4. Group discussions
- 5. Demonstrations

### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Orals	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	50%
2.2 Orals	10%

### **PRESCRIBED READINGS**

- 1. Besa, M. (2011). **Constitution, governance and democracy**. Ndola: Mission Press
- 2. GRZ (2001). **The Public Health Act**, CAP 295. Lusaka: Ministry of Justice
- 3. Rose, F. (2015). **Blackstone's statutes text, cases and materials on criminal law in Zambia on contract, tort and restitution**. London, Oxford Press



## RECOMMENDED READINGS

1. GRZ (2001). **The Food and Drugs Act, CAP 303**. Lusaka: Ministry of Justice
2. Swayne, Linda E., Duncan, W. J., Ginter, P. M. (2008). **Strategic Management of Health Care Organizations**. Blackwell Publishers.
3. World Health Organisation (2005). **Strengthening management in low-income countries: lessons from Uganda**. Geneva: WHO Press.

**COURSE NAME: RURAL HEALTH PRACTICAL**

**COURSE CODE: RHP221**

### **INTRODUCTION**

The course will expose students to rural experience in order for them to practice the skills they will acquire in various courses which include: Community Health, Laboratory Services, Control of Communicable Diseases, Water and Sanitation, Vector Control, Building Construction and Village Planning, Office Organisation and Administration.

### **COURSE OBJECTIVES**

1. Describe community health services applicable to rural areas
2. Describe the procedure of collecting samples for macro and microscopic examination
3. Explain various strategies for the control of communicable diseases
4. Describe the procedure of carrying out inspections of water sources
5. Outline the procedure for construction of sanitary facilities
6. Outline the methods used in the control of vectors
7. Describe various materials used in building construction
8. Elucidate administrative procedures in a public health office

### **COURSE LEARNING OUTCOMES**

1. Conduct community diagnosis
2. Conduct well construction and treatment of water
3. Draw up programme for prevention and control of malaria
4. Conduct health education programmes
5. Carry out sanitary inspections in villages and peri urban setting
6. Carry out school health services as an integrated health team
7. Recommend and design appropriate human excreta and refuse disposal systems
8. Conduct sanitary surveys to determine the suitability of different water sources and take appropriate action
9. Conduct training of water point committees
10. Conduct sanitary inspections of schools and give appropriate recommendations
11. Collect blood samples for microscopic examination of malaria parasites and schistosomes;
12. Collect water samples for bacteriological and chemical analysis
13. Institute interventions for prevention and control of malaria
14. Conduct investigation of cases of notifiable diseases and food poisoning including any outbreak of disease;
15. Perform administrative procedures in a registry of Public Health Department
16. Manage a public health office

## **COURSE CONTENT UNIT 1:**

### **COMMUNITY HEALTH**

#### **1.1 Child Health Services:**

- 1.1.1 Conduct health education to mothers with under five children on importance of nutrition
- 1.1.1 Participate in growth monitoring of under five children;
- 1.1.2 Participate in data collection (entering new attendances and tallying) in a child health clinic;
- 1.1.3 Participate in data analysis (compiling coverage) of child health data.
- 1.1.4 Participate in the administration of prophylactic drugs; and
- 1.1.5 Conduct community nutritional surveillance

#### **1.2 School Health Services:**

- 1.2.1 Draw a calendar of activities for school health services as an integrated health team;
- 1.2.2 Conduct sanitary inspections of schools and give appropriate recommendations
- 1.2.3 Conduct health education to school pupils on the importance of keeping good sanitary environment;
- 1.2.4 Participate in the administration of prophylactic medicine;

#### **1.3 General sanitary inspections:**

- 1.3.1 Conduct sanitary inspection of villages and townships and give appropriate recommendations to village headmen and council secretaries respectively;
- 1.3.2 Participate in training and supervision of community health workers (CHWs).

### **UNIT 2: LABORATORY SERVICES**

- 2.1 Collect samples and perform macro and microscopic examination for (stool or ova, urine for analysis (dip and red);  
Collect blood samples, prepare and stain blood films and examine microscopically for malaria parasites and schistosomes; and
- 2.2 Participate in the interpretation of results.

### **UNIT 3: CONTROL OF COMMUNICABLE DISEASES**

- 3.1 Carry out investigation of cases of notifiable diseases and food poisoning including any outbreak of disease;
- 3.2 Participate in disinfecting articles, fabrics and rooms;
- 3.3 Participate in contact tracing of tuberculosis cases
- 3.4 Health Education in the community on prevention of common diseases and personal hygiene.

### **UNIT 4: WATER AND SANITATION**

- 4.1 Participate in the construction of ventilated improved pit latrines, pit latrines with a slabs and sanitary platforms (SanPlats)

- 4.2 Conduct sanitary inspection of rural water supply sources (community boreholes, hand dug wells and springs)
- 4.3 Participate in protecting rural water supply sources (community boreholes, hand dug wells and springs).
- 4.4 Conduct training of water point committees on effective operation and maintenance of rural water supply sources

## **5. VECTOR CONTROL**

### **5.1 Malaria Control:**

- 5.1.1 Conduct malaria survey (entomological survey, and parasitological survey);
- 5.1.2 Spraying techniques (residual spraying, space spraying, and larviciding); and
- 5.1.3 Treatment of mosquito nets (preparation of chemicals and treatment of the nets).

### **5.2 Bilharzia Control:**

- 5.2.1 Snail survey;
- 5.2.2 Parasitological survey; and
- 5.2.3 Application of interventions.

### **5.3 Rodent Control:**

- 5.3.1 Selection of sites by conducting rodent survey;
- 5.3.2 Preparation of rodent survey forms; and
- 5.3.3 Pre-baiting and baiting rodents.

## **UNIT 6: BUILDING CONSTRUCTION AND VILLAGE PLANNING**

### **6.1 Building Construction:**

- 6.1.1 Selection of sites for commercial and domestic buildings; and Participate in the construction of domestic buildings (Dwelling houses, Ventilated Improved Pit latrine, and any constructional project available).

### **6.2 Village Planning:**

- 6.2.1 Identification of poorly planned villages; and
- 6.2.2 Participate in mapping up improved villages.

## **UNIT 7: OFFICE ORGANISATION AND ADMINISTRATION**

- 7.1 Perform administrative procedures in a Registry of Public Health Department (filing of letters and reports, attend to office correspondence, administration of the meetings - planning, implementation and minuting, prepare daily, weekly, monthly and annual returns, and order stores).

## **NOTIONAL HOURS: 50 HOURS**

- 1. Tutorial: 1 hour per week
- 2. Seminar: 1 hour per week
- 3. Field work: 7 hours per week
- 4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Practical
2. Field Visits
3. Group discussions
4. Demonstrations

## **ASSESSMENT METHODS** **100%**

- |  |     |
|--|-----|
| 1. Student practical attachment report | 40% |
| 2. Student practical evaluation        | 60% |

## **PRESCRIBED READINGS**

1. Afubwa, S. O. and Mwanthi, M. A. (2014). **Environmental Health and Occupational Health and Safety**. Nairobi: Acrocodile Publishing.
2. Chudley, R., and Greeno, R. (2008). **Building construction handbook**. Oxford: Butterworth-Heinemann.
3. Hawker, J., Begg, N., Blair, I., Reintjes, R., and Weinberg, J. (2008). **Communicable Disease Control Handbook**. Wiley-Blackwell.

## **RECOMMENDED READINGS**

1. Edward, A., Iano, J. (2008). **Fundamentals of Building Construction Materials and Methods**. Oxford: Butterworth-Heinemann
2. Laverack, G. (2004). **Health Promotion Practice (Power and Empowerment)**. London: SAGE Publication.
3. Webber, R. (2012). **Communicable Diseases: A Global Perspective** (Modular Texts Series) 4th ed. Edition. London: Cabi.

#### 14.4. SECOND YEAR SECOND SEMESTER COURSES

	<b>Second semester of the second year</b>
BUT222	Building Technology
IDS212	Integrated Disease Surveillance & Response
FSH212	Food Safety & Hygiene
AAP212	Animal Anatomy & Physiology
WAS212	Water Quality Surveillance
SHE212	Sanitation & Hygiene Education
PHD212	Port Health and Disinfection – Theory and Field Practical

**COURSE TITLE: BUILDING TECHNOLOGY**

**COURSE CODE: BUT222**

### **INTRODUCTION**

The course provides extensive background of development planning and building construction using appropriate technology in relation to design and land use. The course will also focus on the enforcement of the Zambian Laws and Regulations relating to buildings.

### **COURSE AIM:**

To enable students demonstrate the understanding of development planning and building construction using appropriate technology in relation to design, land use and legal implications.

### **COURSE OBJECTIVES**

1. Explain the behaviour of forces in beams and structures
2. Describe the design of appropriate building plans
3. Describe laws and regulations regarding building structures
4. Describe common building materials.
5. Describe the procedure for contract signing.
6. Outline different types of building components.
7. Describe different types of wall finishes and their applications.
8. State the significance of internal insulation in roofs and walls
9. Explain legislation related to public Health and Town and Regional Planning.

### **COURSE LEARNING OUTCOMES:**

1. Demonstrate basic construction of buildings.
2. Illustrate various building parts.
3. Demonstrate the understanding of building contract management.
4. Illustrate design of appropriate building plans
5. Identify different types of building components.
6. Supervise community building projects.
7. Inspect buildings and make recommendations to appropriate authorities for action.
8. Enforce Zambian Laws and Regulations relating to buildings
9. Describe the procedure and process of tendering and preparation of tender documents
10. Enforce Public Health, Town and Regional Planning legislation to ensure compliance
11. Illustrate the application of internal insulation in roofs and walls
12. Conduct inspections of newly constructed buildings to determine their suitability for human habitation
13. Inspect buildings in accordance with Public Health (Building Regulations) CAP 295 of the Laws of Zambia
14. Illustrate steps involved in the selection of appropriate technology
15. Scrutinize and approve building plans in line with Public Health (Building Regulations) CAP 295 of the Laws of Zambia
16. Interpret laws and regulations regarding building structures

## **COURSE CONTENT**

### **UNIT 1: BUILDING CONSTRUCTION**

#### **1.1 Introduction to Building Technology**

#### **1.2 Building materials**

- 1.2.1 Bricks
- 1.2.2 Blocks
- 1.2.3 Aggregates
- 1.2.4 Concrete

#### **1.3 Project Administration**

- 1.3.1 Preparation of Building document
- 1.3.2 Preparation and submission of building plans
- 1.3.3 Application for building permit
- 1.3.4 Scrutiny and approval of building plans
- 1.3.5 Building inspection during construction
- 1.3.6 Building regulation and standards

#### **1.4 Tendering and tender documents**

#### **1.5 Contracts**

#### **1.6 Site investigations**

#### **1.7 Site clearance**

- 1.7.1 Setting out
- 1.7.2 Trench excavation

#### **1.8 Foundations**

- 1.8.1 Strip foundations
- 1.8.2 Stepped foundation
- 1.8.3 Pad foundation
- 1.8.4 Raft foundations
- 1.8.5 Piled foundations

#### **1.9 Types of bonding**

- 1.9.1 Stretcher bond
- 1.9.2 English bond
- 1.9.3 Header bond
- 1.9.4 Flemish bond

#### **1.10 Doors**

- 1.10.1 Panel doors
- 1.10.2 Flush doors



1.10.3 Match boarded doors

**1.11 Windows**

1.11.1 Casement windows

1.11.2 Sash windows

1.11.3 Louvre windows

**1.12 Bridging of windows and door openings**

**1.13 Plastering and rendering**

**1.14 Roofs and ceilings**

**1.15 Floors and floor finishes**

**1.16 Paints and painting**

**1.17 Occupation certificate**

**UNIT 2: URBAN HOUSING**

**2.1 Siting and planning of urban housing**

2.1.1 Topographical and geological features

2.1.2 Access to public amenities

2.1.3 Traffic hazards

2.1.4 Planning of housing layout.

**2.2 Design of urban houses with due respect to housing legislation**

2.2.1 Size of rooms

2.2.2 Lighting

2.2.3 Ventilation and heating

2.2.4 Noise and cold insulation

2.2.5 Facilities and amenities

**UNIT 3: RURAL HOUSING**

**3.1 Planning a Village:**

3.1.1 Selection of a site for a village

3.1.2 Location of social amenities in villages: health services; school services;

3.1.3 agricultural services; markets; burial grounds/cemetery and animal kraals.

**3.2 Designing of suitable rural dwelling houses: water supply, sanitary accommodation, bathing shelter, dish rack, kitchen, food storage, adequate natural lighting, and adequate natural ventilation.**

**3.3 Improvement of unplanned villages and rural dwelling houses**

**UNIT 4: APPROPRIATE TECHNOLOGY**

**4.1 Introduction to Appropriate Technology**

4.1.1 Define the term “Appropriate technology”

4.1.2 Concept and principles of appropriate technology

## 4.2 Examples of appropriate technologies

- 4.2.1 WASHE basic needs
- 4.2.2 Cement water storage bin
- 4.2.3 Wells and Water raising mechanisms (Solar and Wind)

## 4.3 Steps in the selection of appropriate technology

- 4.3.1 Identification of the technology
- 4.3.2 Economic reasons
- 4.3.3 Social reasons
- 4.3.4 Cost estimates
- 4.3.5 Tiers of affordability
- 4.3.6 Presentation to community

## TEACHING MATERIALS /EQUIPMENT

1. Building lines
2. Trowels
3. Hammers
4. Spirit levels
5. Pegs
6. Spades
7. Wheelbarrows
8. Floats
9. Plumb bobs

## NOTIONAL HOURS: 100 HOURS

1. Lecture: 3 hours per week
2. Tutorial: 1 hour per week
3. Field work: 3 hours per week
4. Assessment and self-study: 1 hour per week

## TEACHING METHODS:

1. Lectures
2. Group discussions
3. Demonstrations
4. Practical
5. Field visits

## CONTACT HOURS:

## 64 HOURS

- |              |                  |
|--------------|------------------|
| 1. Lectures: | 2 hours per week |
| 2. Practical | 2 hours per week |

## ASSESSMENT METHODS

- |                                 |             |
|---------------------------------|-------------|
| <b>1. Continuous assessment</b> | <b>40 %</b> |
| 1.1 2 Tests                     | 20%         |
| 1.2 2 Assignments               | 10%         |
| 1.3 Practical                   | 10%         |

<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCRIBED READINGS**

1. Chudley, R., and Greeno, R. (2008). **Building construction handbook**. Oxford: Butterworth-Heinemann.
2. Edward, A., Iano, J. (2008). **Fundamentals of Building Construction Materials and Methods**. Oxford: Butterworth-Heinemann
3. Frederick, S.M., and Ricketts, J.T. (2010). **Building Design and Construction Handbook**. McGraw-Hill Professional.

### **RECOMMENDED READINGS**

1. Blankenbaker, E.K. (2013). **Construction and building technology**. Illinois: The Goodheart-willcox company.
2. Chudley, R., and Greeno, R. (2008). **Construction technology**. Amsterdam: Pearson Prentice Hall.
3. Pohl, J. (2011) **Building science: concepts and application**. West Sussex; WilleyBlackwell

**COURSE TITLE: INTEGRATED DISEASE SURVEILLANCE AND RESPONSE**

**COURSE CODE: IDS212**

### **INTRODUCTION**

The course will help students exhibit their skills in disease surveillance and management of disasters. It will also assist students understand the importance of working with appropriate teams and/or sectors in dealing with disasters.

### **COURSE AIM:**

Students should be able to demonstrate the application of knowledge and skills in Integrated Disease Surveillance and disasters management.

### **COURSE OBJECTIVES:**

1. Explain the process of integrated disease surveillance and response
2. Describe types of epidemics
3. Outline organisational framework during an epidemic
4. Describe types of disasters
5. Outline organisational framework for disaster management
6. Describe the stages of disaster management.

### **COURSE LEARNING OUTCOMES:**

1. Identify cases and events of public Health importance
2. Report suspected cases or conditions or events of public Health importance
3. Analyze and interpret data on priority diseases and events
4. Investigate and confirm suspected cases, outbreaks or events
5. Monitor Integrated Disease Surveillance and Response implementation.
6. Monitor and evaluate Integrated Disease Surveillance and Response implementation
7. Manage epidemics
8. Identify types of disasters
9. Monitor the future and background trends in disaster management.
10. Conduct risk and vulnerability assessment following a disaster
11. Apply mitigation measures to alleviate the sufferings of the victims of a disaster
12. Manage disasters

### **COURSE CONTENT**

#### **UNIT 1: INTEGRATED DISEASE SURVEILLANCE AND RESPONSE**

- 1.1 Definition of key concepts (disease surveillance, and integrated disease surveillance and response)
- 1.2 Objectives of integrated disease surveillance and response
- 1.3 Integrated Disease Surveillance and Response and International Health Regulations
- 1.4 Priority diseases for integrated disease surveillance and response
- 1.5 Definition and types of epidemics: progressive epidemic; endemicity; and pandemic
- 1.6 Common sources of epidemics: point common-source; continuous common-source;

and intermittent common-source

- 1.7 Epidemic preparedness: early warning; early detection; notification; verification; early response; post epidemic assessment; and preparedness plan of action.
- 1.8 Identification of cases of priority diseases, conditions, and events
- 1.9 Reporting priority diseases, conditions and events
- 1.10 Analysing disease surveillance data
- 1.11 Investigating suspected outbreaks and other public health events
- 1.12 Preparing to respond to outbreaks and other public health events
- 1.13 Organizational framework of epidemic preparedness:
  - 1.13.1 National Epidemic Preparedness and Prevention Committee and responsibilities
  - 1.13.2 Provincial Epidemic and Prevention Committee and responsibilities
  - 1.13.3 District Epidemic and Prevention Committee and responsibilities
  - 1.13.4 Satellite Epidemic and Prevention Committee and responsibilities
- 1.14 Responding to outbreaks and other public health events
- 1.15 Communicating information during integrated disease surveillance and response
- 1.16 Monitoring, evaluating and improving disease surveillance and response

## **UNIT 2: DISASTER MANAGEMENT**

- 2.1 Definition of terms: disaster; hazards; risk; and vulnerability
- 2.2 Characteristics of a disaster
- 2.3 Kinds of disasters:
  - 2.3.1 Natural disasters (floods, droughts, cyclones, and earthquakes)
  - 2.3.2 Human disasters
- 2.4 Managing disasters
  - 2.4.1 Ethics in handling disasters,
  - 2.4.2 Planning for disaster management,
  - 2.4.3 Pre - disaster planning (leadership and decision making in crisis),
  - 2.4.4 Disaster preparedness, response, recoveries, rehabilitation, and reconstruction
- 2.5 Future and background trends in disaster management
- 2.6 Mitigation measures and programmes for disaster management plans.
- 2.7 Organisation Structure of Disaster Management at different levels and responsibilities:

## **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Field work: 1 hour per week
4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Lectures
2. Field trips
3. Group discussions
4. Practical

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. World Health Organization (2002) **Environmental Health in Emergencies and Disasters**. Geneva: WHO Press.
2. World Health Organization (2008). **International Health Regulations**. 2005. Geneva: WHO Press.
3. World Health Organization and Centers for Disease Control and Prevention (2010). **Technical Guidelines for Integrated Disease Surveillance and Response in the African Region**. Brazzaville: WHO Press.

## RECOMMENDED READINGS

- 1 Coppola D.P. (2007). **Introduction to International Disaster management**. Oxford: Butterworth-Heinemann.
- 2 World Health Organization (2002). **Weekly epidemiological record: An integrated approach to communicable disease surveillance**. Geneva: WHO Press.
- 3 World Health Organization (2005). **Communicable disease control in emergencies: A field manual**. Geneva: WHO Press.

**COURSE TITLE: FOOD SAFETY AND HYGIENE**

**COURSE CODE: FSH212**

### **INTRODUCTION**

The course provides extensive background in food microbiology, food hygiene, and safety management systems. The course emphasizes food as a vehicle in the transmission of diseases and expresses the importance of food hygiene and safety in the prevention of diseases.

### **COURSE AIM**

To equip students with knowledge and skills in food safety and hygiene.

### **COURSE OBJECTIVES**

1. List different sources of microorganisms in food
2. Describe food poisoning
3. Explain factors which influence microbial growth and multiplication in food
4. Outline methods of controlling food contamination
5. Describe various food borne diseases
6. Describe the historical background of food safety and hygiene
7. Define terms commonly used in food safety, hygiene and inspection food premises
8. Describe principles of food safety and hygiene
9. Explain appropriate methods of food preservation and transportation of food products
10. Explain the importance of cleaning and disinfection in food premises
11. Describe various methods of pest control in food premises

### **COURSE LEARNING OUTCOMES**

1. Apply appropriate methods of food preservation
2. Identify appropriate of transportation of food products
3. Establish types of food borne diseases
4. Identify types of food poisoning
5. Apply epidemiological procedures during an investigation of food poisoning
6. Enforce wearing of personal protective clothing by food handlers
7. Implement the training programme for food handlers
8. Investigate factors that influence microbial growth and multiplication in food premises
9. Apply appropriate methods of disinfecting food premises
10. Provide Information Education and Communication (IEC) on hygienic handling, production and transportation of food.
11. Carry out pest control measures in food premises
12. Establish factors influencing microbial growth and multiplication
13. Implement cleaning and disinfection programmes of food premises
14. Carry out inspections on food premises in accordance with Food and Drugs Act, CAP 303 of the Laws of Zambia
15. Apply appropriate food safety management systems
16. Implement Hazard Analysis Critical Control Point (HACCP) concept in food premises' establishments

## **COURSE CONTENT**

### **UNIT 1: FOOD MICROBIOLOGY**

- 1.1 Sources of food contaminants
- 1.2 Microbial growth in food
- 1.3 Factors that influence microbial growth and multiplication:
  - 1.3.1 Intrinsic factors: hydrogen concentration (pH), water activity, redox potential, nutrients, antimicrobial constituents, antimicrobial structure.
  - 1.3.2 Extrinsic factors: temperature, relative humidity, gaseous environment.
  - 1.3.3 Implicit factors
  - 1.3.4 Processing factors
- 1.4 Food poisoning:
  - 1.4.1 Definition of food poisoning;
  - 1.4.2 Types of food poisoning
  - 1.4.3 Investigation of food poisoning (aim of investigation, Investigation procedure, and Epidemiological procedures);
  - 1.4.4 General Preventive measures of food poisoning
- 1.5 Food as a vehicle in the transmission of diseases
- 1.6 Food spoilage and preservation:
  - 1.6.1 Food spoilage
  - 1.6.2 Principles of food preservations
  - 1.6.3 Methods of food preservations; food preservation with low-temperature, food preservation with high-temperature; food preservation techniques with the use of chemicals; physical methods of preservation e.g. by drying; food preservation with radiation; and traditional methods

### **UNIT 2: FOOD HYGIENE**

- 2.1 Historical background of Food Safety in Zambia (Public health inspectorate, Legislation, and Public analyst).
- 2.2 Definition of terms commonly used in food hygiene (Food, hygiene, food handler, contamination, spoilage, food safety, food suitability, wholesomeness, high risk foods,)
- 2.3 Hygiene of food handlers: personal hygiene; medical examinations; personal protective clothing and training of food handlers
- 2.4 Hygiene of food premises: sitting, layout, design and construction of premises; maintenance of hygiene in food establishment in relation to structure.
- 2.5 Cleaning and disinfection in food premises
- 2.6 Pest control in food premises
- 2.7 Design and construction of equipment for use in food premises
- 2.8 Temperature control
- 2.9 Transportation of food products
- 2.10 Staff facilities in food premises: water supply; toilets; hand washing facilities and change rooms.



### **UNIT 3: FOOD SAFETY MANAGEMENT SYSTEMS**

- 3.1 Introduction to food safety management systems
- 3.2 Good Agricultural Practices(GAP)
- 3.3 Standard Operating Procedures (SOP)
- 3.4 Standard Sanitation Operating Procedures (SSOPs)
- 3.5 Good Hygiene Practices ( GHP)
- 3.6 Good Manufacturing Practices (GMP);
- 3.7 Hazard Analysis Critical Control Point (HACCP) concept
- 3.8 Institutional and legal framework for food safety in Zambia.

### **NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Field work: 1 hour per week
- 4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

- 1. Lectures
- 2. Field trips
- 3. Group discussions
- 4. Practical

### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCRIBED READINGS**

- 1 Frazier, W. C and Westhoff, D.C. (2008). **Food Microbiology**. 4<sup>th</sup> edition. NewDelhi: McGraw-Hill
- 2 Ministry of Health (2009). **Food and Drugs Inspection Manual**. Lusaka: Ministry of Health.
- 3 World Health Organization (2006) **FAO/WHO guidance to governments on the application of HACCP in small and/or less-developed food businesses**. Geneva: WHO Press.

## **RECOMMENDED READINGS**

1. Afubwa S. O and Mwanthi M.A. (2014). **Environmental Health and Occupational Health and Safety**. Nairobi: Acrodile Publishing Ltd.
2. FAO/WHO (2001). Food Standards Programme. **Codex Alimentarius – Food hygiene – Basic texts**. 2<sup>nd</sup> Edition. Rome: FAO/WHO Publication,
3. World Health Organization (2010). **FAO/WHO framework for developing national food safety emergency response plans**. Geneva: WHO Press

**COURSE TITLE: ANATOMY AND PHYSIOLOGY OF FOOD ANIMALS**

**COURSE CODE: AAP 212**

### **INTRODUCTION**

The course provides a background in fundamentals of structure of food animals and an understanding of the fundamentals of cellular and tissue functions of food animals.

### **COURSE AIM:**

To equip students with the basic knowledge of the Anatomy and Physiology of Food Animals

### **COURSE OBJECTIVES:**

1. Describe the anatomical and physiological principles applicable to food animals.
2. Describe the composition, structure and general function(s) of the integumentary, skeletal and muscular systems.
3. Describe the composition, structure and general function(s) of the cardiovascular and lymphatic systems.
4. Describe the composition, structure and general function(s) of the respiratory, digestive and urinary systems.
5. Describe the composition, structure and general function(s) of the nervous (including sense organs) and endocrine systems.
6. Describe the composition, structure and general function(s) of the reproductive systems of the bull and cow.
7. Describe the Anatomy and Physiology of Avian species.
8. Describe the Anatomy and Physiology of fin-fish species.
9. Explain various pieces of legislation related to Meat, Poultry and Fish Inspections.

### **COURSE LEARNING OUTCOMES:**

1. Illustrate Anatomical Nomenclature in Food Animals
2. Apply correctly, the directional terms used in Food Animal Anatomy and Physiology.
3. Name eleven body systems and state their general function.
4. Illustrate the outline of an animal cell.
5. Name four basic tissues in animals and state their functions.
6. Identify the location of each system on an animal model.
7. Identify the major organs and state their functions.
8. Differentiate between the various tissues and organs of domestic and food animals.
9. Illustrate the anatomy of avian species.
10. Identify the location of various organs on a poultry teaching model.
11. Illustrate the anatomy of fish.
12. Identify the location of various organs on a fish teaching model.
13. Identify the organs contained in each and state their functions.
14. Illustrate the anatomical organization of fish for the purpose of conducting inspections

15. Illustrate the anatomical organization of avian (poultry) species for the purpose of conducting inspections
16. Compare the anatomy of the Female Reproductive System in various food animals.
17. Classify food animal carcasses according to sex and age based on structure (pelvic girdle) and bone mass/density.
18. Differentiate food animal carcasses according to sex and age based on structure (pelvic girdle) and bone mass/density.

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO ANATOMY AND PHYSIOLOGY OF FOOD ANIMALS:**

- 1.1 Definitions of Anatomy and Physiology
- 1.2 Scope and Branches of Animal Anatomy and Physiology
- 1.3 Anatomical Nomenclature in Food Animals (Planes, Directional Terms & Relationships)
- 1.4 Body systems (Identify each body system and its composition; mention the general function(s) of each body system.
- 1.5 Overview of Cytology and Histology - Description of basic tissues, their location and functions.

### **UNIT 2: SUPPORT AND MOVEMENT:**

#### **2.1 Integumentary system:**

- 2.1.1 Definition, description, composition and functions of the Integumentary System.
- 2.1.2 The role of the integumentary system in body homeostasis (Osmoregulation, Thermoregulation and Excretion).
- 2.1.3 The importance of the Integumentary system in Meat Technology.
- 2.1.4 Differential Anatomy of the Integumentary System in Food Animals, including carcass dressing.

#### **2.2 The skeletal system:**

- 2.2.1 Definition, description, composition and function of the skeletal system.
- 2.2.2 Comparative table of principle bone features of food animals; and
- 2.2.3 Distinction of young and old animals based on skeletal features.
- 2.2.4 Classification and differentiation of age based on teeth.
- 2.2.5 Classification and differentiation of food animal carcasses according to sex and age based on structure (pelvic girdle) and bone mass/density

#### **2.3 The muscular system:**

- 2.3.1 Definition, description, composition and function of the muscular system;
- 2.3.2 Important muscles applicable to meat inspection.
- 2.3.3 Comparison of flesh of various food animals.
- 2.3.4 Classification and differentiation of food animal carcasses according to sex

### **UNIT 3: TRANSPORT OF BODY FLUIDS:**

#### **3.1 The Cardiovascular system (CVS):**

- 3.1.1 Definition, description, function and composition of the circulatory system of ruminants and other animals;
- 3.1.2 Description of the structure (Anatomy) and Function (Physiology) of the heart.
- 3.1.3 The Relationship between the cardiovascular and the lymphatic systems.
- 3.1.4 Comparative Anatomy of the hearts of various food animals.

#### **3.2 The Lymphatic system:**

- 3.2.1 Definition, description, function, composition and location of the principal lymphatic organs of ruminants and other animals.
- 3.2.2 The importance of Lymph nodes (including Haemolymphnodes) in meat inspection and the principal lymph nodes inspected during meat inspection, in particular: (Sub maxillaries, Parotids, Retropharyngeals, Bronchials, Mediastinals, Mesenterics, Prescapulars, Precrural, Ischiatics, and Popliteals).
- 3.2.3 Comparative anatomy of the spleen in various food animals.

### **UNIT 4: ENERGY, MAINTENANCE OF HOMEOSTASIS AND ENVIRONMENTAL EXCHANGE:**

#### **4.1 The Respiratory system:**

- 4.1.1 Definition, description, function and composition of the respiratory system of ruminants and Non-ruminant animals; and
- 4.1.2 Physiology of respiration (Muscles of respiration and Gaseous Exchange at the alveolus).
- 4.1.3 Comparative Anatomy of the Trachea and Lungs in various food animals.

#### **4.2 The Digestive system:**

- 4.2.1 Definition, description, function and composition of the digestive system of ruminants and Non-ruminant animals; and
- 4.2.2 Chemical and mechanical digestion in the Oral Cavity- Ruminants and Nonruminants.
- 4.2.3 Comparative Anatomy of the Dental Formulae of various food animals. 4.2.4 Comparative Anatomy of Tongues in various food animals
- 4.2.5 Digestion in the Polygastric (ruminant) stomach.
- 4.2.6 Digestion in the Monogastric (Pig and Horse) stomach.
- 4.2.7 Accessory Organs of the digestive system.
- 4.2.8 Comparative Anatomy of the Liver in various food animals.
- 4.2.9 Digestion and absorption of nutrients in the small and large intestines.
- 4.2.10 Comparative Anatomy of intestines in various food animals.

#### **4.3 The Urinary System:**

- 4.3.1 Definition, description, location and functions of the principal organs of the Urinary System.
- 4.3.2 Structure and Function of the Kidney and Nephron.
- 4.3.3 Comparative Anatomy of the kidney in various food animals.

## **UNIT 5: REGULATION, INTEGRATION AND CONTROL:**

### **5.1 The Nervous system:**

- 5.1.1 Definitions, general description, location and function of the nervous system; and
- 5.1.2 Divisions of the Nervous System (Central Nervous System vs Peripheral Nervous System; Somatic Nervous System vs Autonomic Nervous System).
- 5.1.3 Reflexes and the Reflex Arc.
- 5.1.4 Importance of the Nervous System in Meat Inspection.

### **5.2 The Endocrine System:**

- 5.2.1 Definition, description, function and composition of the endocrine system of ruminants and other animals;
- 5.2.2 The principal Endocrine Organs in food animals.
- 5.2.3 Importance of Hormones and hormonal actions in Meat Technology.

## **UNIT 6: ANIMAL DEVELOPMENT AND CONTINUITY OF LIFE:**

### **6.1 The Reproductive System of the Bull:**

- 6.1.1 Definition, description, location and functions of the principal organs of the Reproductive System of the Bull.
- 6.1.2 Structure and Function of a Spermatozoon.
- 6.1.3 Significance of castrating male animals.
- 6.1.4 Comparative Anatomy of the Testicles of various food animals.

### **6.2 The Reproductive System of the Cow:**

- 6.2.1 Definition, description, location and functions of the principal organs of the Reproductive System of the Cow.
- 6.2.2 Structure and Function of the ovaries.
- 6.2.3 The Oestrous Cycle.
- 6.2.4 Comparative Anatomy of the Female Reproductive System in various food animals.

## **UNIT 7: AVIAN ANATOMY AND PHYSIOLOGY:**

- 7.1 General anatomy and physiology of Avian Species

## **UNIT 8: FISH ANATOMY AND PHYSIOLOGY:**

- 8.1 General anatomy and physiology of fin-fish species.

## **UNIT 9: LEGISLATION**

- 9.1 Legislation related to Meat, Poultry and Fish Inspections (Public Health Act Cap 295 of the laws of Zambia).

### **NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week

3. Practical/Laboratory work: 1 hour per week
4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

1. Lectures
2. Practical
2. Demonstrations
3. Field trips
4. Group discussions

### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCRIBED READINGS**

1. Collins D. S. (2013). **Meat Hygiene**. 10th Edition. WS Saunders.
2. Herenda. D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO.
3. Wilson, W.G. (2005). **Wilson's Practical Meat Inspection**. Oxford: Blackwell publishing.

### **RECOMMENDED READINGS**

1. Blood, D.C. (2000). **Pocket companion to Veterinary Medicine**. London: BailliereTindall.
2. Fernandez, P and White, W. (2011). **Atlas of Trans-Boundary Animal Diseases and Animales Trans-fronterizas**.
3. Sastry, G. A and Rao, P. R. (2002). **Veterinary Pathology**. 7th edition. CBS press.

**COURSE TITLE: WATER QUALITY SURVEILLANCE**

**COURSE CODE: WQS 212**

### **INTRODUCTION**

This course is designed to prepare students to acquire skills in the surveillance of drinking water with a view to assuring quality and preventing water borne diseases in communities and households.

### **COURSE AIM:**

To equip students with knowledge and skills in drinking water quality surveillance with a view of preventing water borne diseases in communities and households.

### **COURSE OBJECTIVES:**

1. Define key concepts used in drinking-water quality surveillance
2. Describe drinking water quality parameters
3. Demonstrate the knowledge of drinking-water sampling
4. Describe drinking-water testing methods
5. Interpret drinking-water surveillance data
6. Design a sanitary inspection program

### **COURSE LEARNING OUTCOMES:**

1. Interpret drinking water quality surveillance data.
2. State the legal and institutional framework for drinking water quality surveillance in Zambia
3. Elucidate drinking water quality guidelines and standards
4. Select drinking water quality parameters
5. Develop a drinking water sampling plan
6. Formulate a drinking water sampling frequency criteria
7. Label water appropriately
8. Transport water samples to a water quality laboratory
9. Conduct onsite water quality testing
10. Describe types of health risks associated with water points
11. Conduct sanitary inspections of various water sources
12. Interpret sanitary inspection data

### **COURSE CONTENT**

#### **UNIT 1: INTRODUCTION TO WATER QUALITY SURVEILLANCE**

- 1.1 Define water quality monitoring and drinking-water quality surveillance
- 1.2 Objectives of drinking-water quality surveillance
- 1.3 Types of approaches to drinking-water quality surveillance
  - 1.3.1 Audit based approach



- 1.3.2 Direct assessment approach
- 1.4 Legal and institutional framework for drinking-water quality surveillance in Zambia
- 1.5 Drinking-water quality guidelines and standards

## **UNIT 2: DRINKING-WATER QUALITY PARAMETERS**

- 2.1 Selection of drinking-water quality parameters to be included in a surveillance programme.
- 2.2 Microbiological parameters: E-coli, thermotolerant coliforms (faecal coliforms) and total coliforms.
- 2.3 Physical parameters: turbidity, taste, odour, and colour.
- 2.4 Chemicals parameters: nitrate, arsenic, lead, fluoride, iron, manganese, aluminium, pH, residue chlorine, copper and pesticides.

## **UNIT 3: DRINKING-WATER SAMPLING**

- 3.1 Plan for sampling
- 3.2 Sampling frequency criteria (type of sample, season, disease prevalence, risk of contamination, and availability of resources)
- 3.3 Sampling procedures for various drinking water sources (wells, taps, and borehole)
- 3.4 Labelling of water samples
- 3.5 Transportation and storage of samples
- 3.6 Quality assurance and quality control in drinking-water sampling
  - 3.6.1 Multiple sampling
  - 3.6.2 Duplicate samples
  - 3.6.3 Blank sampling

## **UNIT 4: DRINKING-WATER TESTING METHODS**

- 4.1 Onsite water quality testing
  - 4.1.1 Observation
  - 4.1.2 Presence/absence tests
  - 4.1.3 Use of portable labs
- 4.2 Offsite / centralised laboratory
- 4.3 Microbiological testing methods
  - 4.3.1 Presence/absence test
  - 4.3.2 Most probable number test
  - 4.3.3 Membrane filtration test
- 4.4 Chemical testing methods
  - 4.4.1 Volumetric titration
  - 4.4.2 Colorimetric methods
  - 4.4.3 Atomic absorption spectrometry
  - 4.4.4 Chromatography
  - 4.4.5 Residual free chlorine test

## **UNIT 5: INTERPRETATION AND ANALYSIS OF DRINKING-WATER SURVEILLANCE DATA**

- 5.1 Methods of interpreting and analysing water quality surveillance data
  - 5.1.1 Comparison analysis
  - 5.1.2 Trend analysis
  - 5.1.3 Statistical analysis
- 5.2 Format for drinking-water quality surveillance report: Introduction; Objectives; Materials and methods; Results; and Conclusion & recommendations.

## **UNIT 6: SANITARY INSPECTIONS**

- 6.1 Definition of sanitary inspection
- 6.2 Types of health risks associated with water points
- 6.3 Frequency of sanitary inspections
- 6.4 Sanitary inspection forms
- 6.5 Carrying out sanitary inspections of water supply systems: boreholes with hand pumps; hand dug wells with a windlass; springs; and conventional water treatment plants
- 6.6 Interpretation of sanitary inspection data
- 6.7 Writing sanitary inspection report

## **MATERIALS /EQUIPMENT**

- 1. Water sampling kit
- 2. Protective clothing (Overalls, gloves, masks, helmet and gumboots)
- 3. Lovibond comparator
- 4. Portal labs

## **NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/Laboratory work: 1 hour per week
- 4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Field visits
- 4. Group discussions

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. Alley E.R. (2000). **Water quality control handbook**. New York: WEF Press.
2. Howard, A.G. (2002). **Water supply surveillance: a reference manual**. Leicestershire: WEDC, Loughborough University.
3. World Health Organization (2011). **Guidelines for drinking-water quality. 4<sup>th</sup> Edition**. Geneva: World Health Organization.

## RECOMMENDED READINGS

1. Centre for Affordable Water and Sanitation Technology (2013). **Introduction to drinking water quality testing**. Alberta: Centre for Affordable Water and Sanitation Technology.
2. Howard, A.G. (2002). **Water quality surveillance: a practical guide**. Leicestershire: WEDC, Loughborough University.
3. World Health Organization (2006). **Guidelines for drinking-water quality, volume 1: recommendations**. Geneva: World Health Organization.

## **COURSE TITLE: SANITATION AND HYGIENE EDUCATION**

**COURSE CODE: SHE212**

### **INTRODUCTION**

The course is intended to assist students acquire knowledge and skills in providing education in sanitation and hygiene to the community members. The course will also highlight the techniques of managing hygiene education programmes at community level including the enforcement of laws related to sanitation.

### **COURSE AIM**

To equip students with the knowledge and skills in sanitation and hygiene education approaches.

### **COURSE OBJECTIVES:**

1. Define key concepts used in sanitation
2. Describe improved sanitation facilities
3. Elucidate various hygiene education methods you can recommend at community level
4. Describe laws related to sanitation
5. Explain the spread of faecal-oral diseases
6. Describe the design and construction details of improved sanitation technologies
7. Explain strategies of faecal sludge management
8. Describe hygiene promotion strategies at community level

### **COURSE LEARNING OUTCOMES:**

1. Apply concepts of sanitation during programme implementation
2. Identify appropriate preventive measures against faecal-oral diseases
3. State legal and institutional framework for sanitation in Zambia
4. Identify laws related to sanitation
5. Enforce laws related to sanitation
6. Analyse various sanitation technologies
7. Illustrate faecal – oral route of transmission
8. Recommend appropriate sanitation technologies to households
9. Advise appropriate sanitation options during an emergency
10. Demonstrate the construction of sanitation technologies
11. Recommend appropriate methods of faecal sludge management
12. Conduct hygiene education at community level
13. Manage hygiene education programmes
14. Analyse various hygiene education methods you can recommend at community level

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO SANITATION**

- 1.1 Definition of key concepts in sanitation: sanitation, excreta, Blackwater, greywater and brown water.
- 1.2 Reasons why excreta should be properly managed.
- 1.3 Transmission of faecal-oral diseases (F-diagram)
- 1.4 Preventive measures against faecal-oral diseases
- 1.5 Legal and institutional framework for sanitation in Zambia.

### **UNIT 2: SITING AND CONSTRUCTION OF IMPROVED SANITATION FACILITIES**

- 2.1 Definition of “improved” sanitation facilities
- 2.2 Flush toilet
- 2.3 Pour-flush toilet
- 2.4 Siting and construction of ventilated improved pit (VIP) latrine
- 2.5 Siting and construction of pit latrine with slab
- 2.6 Siting and construction of composting toilet
- 2.7 Design, siting and construction of a septic tank and soakaway

### **UNIT 3: FAECAL SLUDGE MANAGEMENT**

- 3.1 Define faecal sludge management
- 3.2 Problems and challenges in faecal sludge management
- 3.3 Main options for pit emptying and faecal sludge transport: manual emptying; and mechanical emptying.
- 3.4 Options for faecal sludge management: sludge drying beds; composting with organic solid waste; and anaerobic digestion with biogas use.

### **UNIT 4: HYGIENE EDUCATION**

- 4.4 Scope of hygiene education
- 4.5 Hygiene educational methods
  - 4.5.1 Participatory Hygiene and Sanitation Transformation (PHAST) methodology:
    - 4.5.1.1 Introduction to PHAST methodology;
    - 4.5.1.2 Step 1: problem identification;
    - 4.5.1.3 Step 2: problem analysis;
    - 4.5.1.4 Step 3: planning for solutions;
    - 4.5.1.5 Step 4: selecting options;
    - 4.5.1.6 Step 5: planning for new facilities and behaviour change;
    - 4.5.1.7 Step 6: planning for monitoring and evaluation; and
    - 4.5.1.8 Step 7: participatory evaluation.
  - 4.5.2 Community Led Total Sanitation (CLTS) methodology:
    - 4.5.2.1 Introduction to CLTS methodology;
    - 4.5.2.2 Step 1: pre-triggering activities;
    - 4.5.2.3 Step 2: triggering activities; and
    - 4.5.2.4 Step 3: post-triggering guidelines
  - 4.5.3 School Led Total Sanitation (SLTS)

## **MATERIALS /EQUIPMENT**

1. Protective clothing (Overalls, gloves, musk, helmet and gumboots)
2. Masonry tools (trowel, spirit level, float, sanplat mould)
3. Materials (cement, sand, reinforcement bars and aggregate)

## **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Field work: 1 hour per week
4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Lectures
2. Practical
3. Field visits
4. Group discussions

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS**

1. Kamal, K. (2008). **Handbook on community-led total sanitation**. London: Plan United Kingdom
2. Swiss Federal Institute of Aquatic Science and Technology (2014). **Compendium of sanitation systems and technologies. 2<sup>nd</sup> edition**. Geneva: Eawag (Sandec).
3. WHO (2000). **Participatory hygiene and sanitation transformation step by step activities**. Geneva: WHO press.

## **RECOMMENDED READINGS**

1. IWA Publishing (2014). **Faecal sludge management: systems approach for implementation and operation**. London: IWA Publishing.
2. WHO (2013). **Technical notes on drinking-water, sanitation and hygiene in emergencies**. Loughborough: WEDC. UNICEF (2014). **School-Led Total Sanitation: School Facilitator Training Guide**. UNICEF press

## **COURSE TITLE: PORT HEALTH AND DISINFECTION**

**COURSE CODE: PHD211**

### **INTRODUCTION**

The course is designed to equip students with knowledge and skills in the inspection of port facilities, ships, vehicles and aircrafts as per international health regulations. The course will also expose students the control of vectors at port health facilities, ships, aircrafts, and vehicles as per international health requirements.

### **COURSE AIM:**

To acquire knowledge and skills in port health management and disinfection as applied in the control of communicable diseases.

### **COURSE OBJECTIVES**

1. Describe the purpose of Port Health
2. Outline principles of Port Health
3. Explain the scope of Port Health
4. Outline diseases which are notifiable under the International Health Regulations
5. Describe Port Health procedures at portals of entry
6. Outline health documents required at designated airports, ports and ground crossings
7. Describe inspection procedures for airports, aircraft, dock premises and ships
8. Describe control measures for vermin and vectors in aircrafts, marine vessels and vehicles
9. Describe the types and methods of disinfection

### **COURSE LEARNING OUTCOMES**

1. Apply skills and knowledge in Port Health management as required by WHO International Health Regulations and Public Health Regulations
2. Identify quarantinable diseases as per the International Health Regulations (2005)
3. Identify signs and symptoms of quarantinable diseases
4. Design inspection procedures for airports, aircraft, dock premises and ships
5. Inspect aircrafts, airports, dock premises, vehicles and ships
6. Control vermin and vectors in aircrafts, marine vessels and vehicles
7. Apply Port Health procedures in implementing port health activities
8. Elucidate the roles of members' countries in control of transboundary diseases
9. Conduct disinfection process skillfully
10. Apply precautionary measures when handling disinfectants
11. disinfection procedures
12. Identify the methods of disinfection in relation to the type of materials/surface involved
13. Apply the disinfection formulations in accordance with the provisions contained in chemical safety handbook
14. Apply control measures for vermin and vectors in aircrafts, marine vessels and vehicles
15. Facilitate the administration of prophylactic treatment to suspected individuals
16. Issue certificates of vaccination clearance to deserving passengers at the portal of entry

## **UNIT 1: PORT HEALTH (THEORY)**

- 1.1 Definitions of key concepts used in port health: affected; contamination; conveyance; decontamination; deratting; disinfection; disinsection; free pratique; health measure; point of entry port; and quarantine.
- 1.2 Purpose and scope of international health regulations
- 1.3 Public health measures at point of entry
  - 1.3.1 Health measures on arrival and departure
  - 1.3.2 Special provisions for conveyances and conveyance operators
  - 1.3.3 Special provisions for travellers
  - 1.3.4 Special provisions for goods, containers and container loading areas
- 1.4 Health documents required at designated airports, ports and ground crossings
  - 1.4.1 Certificates of vaccination or other prophylaxis
  - 1.4.2 Maritime Declaration of Health
  - 1.4.3 Health Part of the Aircraft General Declaration
  - 1.4.4 Ship sanitation certificates
- 1.5 Port health procedures
- 1.6 Inspection of: airports, aircraft, dock premises and ships
- 1.7 Control of vermin and vectors in aircrafts, marine vessels and vehicles

## **UNIT 2: DISINFECTION**

- 2.1 Definition of the terms; disinfection, deodorant, antiseptic, sterilisation, pasteurisation, and germicide.
- 2.2 Types of disinfection
  - 2.2.1 Current disinfection
  - 2.2.2 Concurrent disinfection
  - 2.2.3 Terminal disinfection
- 2.3 Types of disinfectants: chemical disinfectants, liquid disinfectants, gaseous disinfectants, natural disinfectants, physical disinfectants, and heat.
- 2.4 Methods used in disinfecting premises, different materials and equipment
- 2.5 Legal requirements
  - 2.5.1 Public Health Act, CAP 295 (Part IV), Section 15-27 (Infectious Diseases)
  - 2.5.2 Public Health Act (Reg. 24 Infectious Disease Control)
  - 2.5.3 WHO International Health Regulations, 2005

## **UNIT 3: PORT HEALTH (PRACTICALS)**

- 3.1 Participate in inspection of port facilities to ensure facilities used by travellers are maintained in a judicious manner.
- 3.2 Participate in the inspection of ships, vehicles and aircrafts as per international health regulations
- 3.3 Participate in the surveillance of diseases of trans-boundary importance as per international health regulations
- 3.4 Participate in the control of vectors at port health facilities, ships, aircrafts, and vehicles as per international health requirements
- 3.5 Participate in issuing of ship sanitation certificates
- 3.6 Participate in verification of yellow fever certificates



- 3.7 Participate in the inspection of food stuffs entering and leaving the country to ensure compliance with food safety legislation
- 3.8 Participate in inspection of pesticides and other toxic substances entering and leaving the country to ensure compliance with environmental legislation
- 3.9 Participate in disinfection of port health facilities as per international health regulations
- 3.10 Inspect food meant for travellers
- 3.11 Participate in public health emergency contingency planning at designated ports of entry.

### **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Field work: 1 hour per week
4. Assessment and self-study: 1 hour per week

### **TEACHING METHODS:**

1. Lectures
2. Practical
3. Group discussions
4. Field trips
5. Demonstrations

### **ASSESSMENT METHODS**

<b>1. Continuous Assessment</b>	<b>40%</b>
1.1 1 test	10%
1.2 Student practical attachment report	20%
1.3 Student practical evaluation	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical.	20%

### **PRESCRIBED READINGS**

1. World Health Organization and Centers for Disease Control and Prevention (2010). **Technical Guidelines for Integrated Disease Surveillance and Response in the African Region**. Brazzaville: WHO Press.
2. World Health Organization (2008). **International Health Regulations (2005)**. Geneva: WHO Press.
3. World Health Organization (2002). **Environmental Health in Emergencies and Disasters**. Geneva: WHO Press.

## **RECOMMENDED READINGS**

1. Coppola D.P. (2007). **Introduction to International Disaster management**. Oxford: Butterworth-Heinemann.
2. World Health Organization (2002). **Weekly epidemiological record: An integrated approach to communicable disease surveillance**. Geneva: WHO Press.
3. World Health Organization (2005). **Communicable disease control in emergencies: A field manual**, Geneva: WHO Press.

#### 14.5. THIRD YEAR FIRST SEMESTER COURSES

<b>Course code</b>	<b>First semester of the third year</b>
FIP311	Food Inspection, Preservation & Processing
REB311	Research & Biostatistics
EPC311	Chemical Safety & Management
WAM311	Health-Care Waste Management
SHE311	Wastewater Management
GMP321	General Meat Pathology
UHP331	Urban Health Practical

**COURSE TITLE: FOOD INSPECTION, PRESERVATION AND PROCESSING**

**COURSE CODE: FIP331**

### **INTRODUCTION**

This course provides students with knowledge and skills in food inspection, preservation, and processing. The course also focuses on international laws that regulate the import and export of food as well as the enforcement of food laws. Further, the course will expose student to the inspection of various foods leading to making appropriate judgments and/recommendations.

### **COURSE AIM:**

To equip students with knowledge and skills in food inspection, preservation, and processing

### **COURSE OBJECTIVES:**

1. Outline the procedure of inspecting food stuffs offered for sale to the public
2. Describe various food preservation methods
3. Inspect food processing premises
4. Explain food safety laws
5. Describe inspection procedures for various foods
6. Describe principles of food preservation
7. Outline various methods of food processing
8. Describe international laws that regulate the import and export of food

### **COURSE LEARNING OUTCOMES:**

1. Apply concepts and approaches of modern food inspection during practical food inspection
2. Inspect food premises in line with food inspection procedure outlined in Food and Drugs Act & its Regulations
3. Inspect food stuffs offered for sale to the public
4. Inspect food processing premises
5. Conduct inspection of various foods and make appropriate judgment
6. Identify different food spoilage
7. Elucidate principles of food preservation
8. Recommend appropriate methods of food preservation
9. Recommend appropriate methods of food processing
10. Identify adulterants or extraneous matter in food
11. Analyse food labels
12. Promote traditional methods of food preservation
13. Conduct food sampling and interpret laboratory results.
14. Analyse food complaints and thereafter take appropriate action
15. Enforce relevant food laws

## **COURSE CONTENT**

### **UNIT 1: FOOD INSPECTION**

- 1.1 Concepts and approaches of modern food inspection
- 1.2 Role and responsibilities of stakeholders in the food chain
  - 1.2.1 Government
  - 1.2.2 Consumers
  - 1.2.3 The food industry
- 1.3 Food inspection procedure as per Food and Drugs Act & its Regulations
- 1.4 Inspection of milk and milk products
- 1.5 Inspection of cereals grains, pulses and legumes
- 1.6 Inspection of fruits and vegetables
- 1.7 Inspection of alcoholic and non-alcoholic beverages
- 1.8 Inspection of spices, herbs and condiments
- 1.9 Inspection of food additives
- 1.10 Inspection of sauces and pickles
- 1.11 Inspection of dried fruits and nuts
- 1.12 Inspection of bread and other bakery products
- 1.13 Inspection of eggs and egg products
- 1.14 Inspection of meat and meat products
- 1.15 Inspection of canned and other packaged foods

### **UNIT 2: FOOD PRESERVATION**

- 2.1 Food spoilage
- 2.2 Principles of food preservation
- 2.3 Methods of food preservation
  - 2.3.1 Food preservation with the use of low-temperature
  - 2.3.2 Food preservation with the use of high-temperature
  - 2.3.3 Food preservation with the use of chemicals
  - 2.3.4 Food preservation with the use of radiation
  - 2.3.5 Food preservation by modifying the atmosphere
  - 2.3.6 Traditional methods of food preservation

### **UNIT 3: FOOD PROCESSING**

- 3.1 Milk processing; high temperature short time (HTST), ultra heat treatment (UHT), pasteurisation, sterilisation, and homogenisation.
- 3.2 Making of milk products; cheese, butter, fermented milk, dried milk, and ice cream.
- 3.3 Flour milling
- 3.4 Maize milling
- 3.5 Bread making
- 3.6 Canning
- 3.7 Meat processing; sausage, mutton, bacon, and ham.

## **UNIT 4: FOOD SAFETY LAW**

### **4.1 Food adulteration**

4.1.1 Brief history of common adulteration

4.1.2 Common adulterants.

### **4.2 Food labelling**

4.2.1 Labelling and interpretation

4.2.2 Mandatory labelling

### **4.3 Food sampling**

4.3.1 Aseptic food sampling procedures

4.3.2 Classes of food samples: formal, Informal, food standards samples, seizure samples, documentary samples, and import samples.

4.3.3 Sampling form

### **4.4 Food complaints**

4.4.1 Foods not of nature, substance or quality demanded

4.4.2 Extraneous matter in food

4.4.3 Food legislation: Public health Act Cap 295; and Food and Drugs Act 303.

4.4.4 Food and Drug Regulations

4.4.5 International agreements on import and export of food: Technical barriers to trade (TBT); CODEX Alimentarius Commission; and Sanitary and Phytosanitary (SPS) measures.

## **MATERIALS /EQUIPMENT**

1. Food sampling kit
2. Dry borer tube
3. Probe
9. Food thermometer
10. Sampling containers

## **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
4. Field work: 2 hours per week
5. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Lectures
2. Practical
3. Demonstrations
4. Field trips
5. Group discussions

## **ASSESSMENT METHODS**

- |                                 |             |
|---------------------------------|-------------|
| <b>1. Continuous assessment</b> | <b>40 %</b> |
| 1.1 2 Tests                     | 20%         |

1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCIBED READINGS**

1. FAO (2008). **Risk-Based Food Inspection Manual**. Rome: FAO Publications
2. Ministry of Health (2009). **Food and Drugs Inspection Manual**. Lusaka: MoH publications
3. World Health Organization (2010). **FAO/WHO framework for developing national food safety emergency response plans**. Geneva: WHO Press

### **RECOMMENDED READINGS**

1. FAO and WHO (2005). **Food Import and Export Inspection and Certification Systems**. Second Edition. Geneva: WHO press.
2. FAO/WHO (2000). **Food Standards Programme. Codex Alimentarius– Food Labelling**, 2<sup>nd</sup> ed. Rome: FAO/WHO Publications.
- 4 Frazier, W. C and Westhoff, D.C. (2008). **Food Microbiolog**, 4<sup>th</sup> edition. New Delhi: McGraw-Hill

**COURSE TITLE: RESEARCH AND BIOSTATISTICS**

**COURSE CODE: REB311**

### **INTRODUCTION**

The course introduces students to research methodology and its different aspects including development of skills required in writing a research proposal and executing the project. It further introduces students to various statistical methods and their practical applications in research.

### **COURSE AIM:**

To enable students demonstrate the understanding of research and biostatistics to solve public health problems.

### **COURSE OBJECTIVES:**

1. Outline the concepts and principles of research
2. Explain the process of identifying the research problem.
3. Review appropriate literature for the identified problem.
4. Formulate research aim, objectives, research questions and hypothesis.
5. Describe the research methodology for the identified research problem
6. Describe the steps involved in writing a research protocol/proposal.
7. Describe the process of writing a dissertation
8. Explain basic statistical approaches applied to medical field.
9. Describe the measures of central tendency and dispersion.

### **COURSE LEARNING OUTCOMES:**

1. Conduct research relating to environmental health and public health.
2. Conduct sampling procedures of various data sets.
3. Develop the theoretical frame work of research
4. Develop appropriate research design of the study
5. Contrast between qualitative research and quantitative research
6. Apply concepts of research in research process
7. Develop the research questions
8. Develop study objectives
9. Develop a research protocol/proposal
10. Differentiate inferential statistics from descriptive statistics
11. Summarise data using tables and graphs
12. Apply scales of measurement during the preparation of questionnaires
13. Illustrate different divisions of Confidence Intervals and what they mean in decision making
14. Illustrate the Normal Distribution Curve
15. Formulate the Null and Alternative hypotheses
16. Test the hypothesis by conducting a chi-squared test
17. Develop a research report/dissertation



## **COURSE CONTENT**

### **UNIT 1: RESEARCH**

#### **1.1 Introduction to research**

- 1.1.1 Definition of Research and concepts used in research;
- 1.1.2 Functions of research
- 1.1.3 Characteristics of research;
- 1.1.4 Types of research;
- 1.1.5 Modes of acquisition of knowledge

#### **1.2 Selection, analysis and formulation of the research problem:**

- 1.2.1 Identification of the research problem;
- 1.2.2 Prioritizing the problem;
- 1.2.3 Analysis; and
- 1.2.4 Justification.

#### **1.3 Literature review:**

- 1.3.1 Literature and other available information;
- 1.3.2 Importance of Literature Review;
- 1.3.3 Sources of Literature; and
- 1.3.4 Method of reading the materials.

#### **1.4 Formulation of objectives:**

- 1.4.1 Research question and hypothesis
- 1.4.2 General objectives;
- 1.4.3 Specific objectives;

#### **1.5 Research methodology:**

- 1.5.1 Study area and population
- 1.5.2 Types of study;
- 1.5.3 Study variables;
- 1.5.4 Sample size determination;
- 1.5.5 Sampling and sampling procedure;
- 1.5.6 Data collection and data collection procedure;
- 1.5.7 Data management;
- 1.5.8 Data analysis;
- 1.5.9 Data processing programmes (Access, Excel, Epi Info, Stata and SPSS);
- 1.5.10 Dissemination
- 1.5.11 Ethical considerations;

#### **1.6 Work plan:**

- 1.6.1 Research personnel
- 1.6.2 Budget
- 1.6.3 Work schedule/Ghant Chart

## **1.7 Format for proposal**

- 1.7.1 Research topic/Research question
- 1.7.2 Introduction
  - 1.7.2.1 Background information
  - 1.7.2.2 Problem statement
  - 1.7.2.3 Justification
  - 1.7.2.4 Objectives of the study
  - 1.7.2.5 General objective
  - 1.7.2.6 Specific objectives
- 1.7.3 Literature review
- 1.7.4 Research methodology
  - 1.7.4.1 Study area and study population
  - 1.7.4.2 Study sample size and sampling procedure
  - 1.7.4.3 Data collection and data collection techniques
  - 1.7.4.4 Data analysis
  - 1.7.4.5 Dissemination
- 1.7.5 Work plan
  - 1.7.5.1 Research personnel
  - 1.7.5.2 Budget
  - 1.7.5.3 Gantt chart

## **UNIT 2: BIOSTATISTICS**

### **2.1 Introduction to statistics**

- 2.1.1 Definition of Biostatics and Statistics
- 2.1.2 Purpose and functions of Statistics
- 2.1.3 Types of Statistics and Statistical data; Characteristics of Statistics

### **2.2 Scales of measurement:**

- 2.2.1 Definition of measurement;
- 2.2.2 Properties of a measurement scale (Magnitude, Equal intervals, and Absolute zero point);
- 2.2.3 Scales of measurement
  - 2.2.3.1 Nominal scale
  - 2.2.3.2 Ordinal scale
  - 2.2.3.3 Numerical scale (Interval and Ratio Scales)

### **2.3 Summarising data & presenting in tables and graphs**

- 2.3.1 Numerical presentation
  - 2.3.1.1 Definition of frequency distribution
  - 2.3.1.2 Construction of frequency tables
  - 2.3.1.3 Summarizing data from discrete variates
  - 2.3.1.4 Summarizing data from continuous variates
- 2.3.2 Graphical presentation and pictorial presentation

- 2.3.2.1 Line graphs
- 2.3.2.2 Bar chart
- 2.3.2.3 Histograms
- 2.3.2.4 Polygons and curves
- 2.3.2.5 Histograms
- 2.3.2.6 Pie charts
- 2.3.2.7 Box plots

#### **2.4 The normal distribution:**

- 2.4.1 Description of a normal distribution;
- 2.4.2 Properties of a normal distribution curve;
- 2.4.3 The central limit theorem;
- 2.4.4 Confidence intervals and confidence limits;
- 2.4.5 Level and test of significance.

#### **2.5 Characteristics of frequency distribution:**

- 2.5.1 Skewness (Positive skewness, and Negative skewness);
- 2.5.2 Location (Definition of location); Scatter (Definition of scatter); Kurtosis (Kurtosis of distribution); and
- 2.5.3 Importance of measures of skewness and kurtosis.

#### **2.6 Formulation of hypothesis:**

- 2.6.1 Definition of hypothesis;
- 2.6.2 Hypothesis testing procedure; and
- 2.6.3 Decision of errors (Type I error and Type II error).

#### **2.7 Probability and Test of Significance:**

- 2.7.1 Definition of probability;
- 2.7.2 Types of probability (A priori type, and A posteriori type);
- 2.7.3 Significance test and level in probability (Definition of significance test, and how to conduct a significance test);

#### **2.8 Measures of Central Tendency:**

- 2.8.1 Definition of measures of Central Tendency;
- 2.8.2 Tools that Measure location (Mean, Median, and Mode).

#### **2.9 Measures of Dispersion:**

- 2.9.1 Definition of measures of dispersion/scatter;
- 2.9.2 Tools that measure scatter (Range, Variance, and Standard deviation); and
- 2.9.3 Mean Deviation - Average Deviation – (Calculation of Mean Deviation, Calculation of Mean Deviation from median, and Calculation of Mean Deviation from mean).

#### **2.10 Statistical test**

- 2.10.1 Chi-squared test

## **NOTIONAL HOURS: 90 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 2 hours per week
3. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Lectures
2. Tutorials
3. Group discussions

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 Research proposal	20%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Research report	20%

## **PRESCRIBED READINGS**

1. Diamond, I. and Jefferies, J. (2002). **Beginning Statistics: An introduction for Social Scientists**. London, Sage Publications
2. World Health Organization / International Development Research Centre (2003). **Designing and Conducting Health Systems Research Projects: Volume I: Proposal development and fieldwork**. Amsterdam: KIT Publishers.
2. World Health Organization / International Development Research Centre (2003). **Designing and conducting health systems research projects: Volume II: Data analysis and report writing**. Amsterdam: KIT Publishers.

## **RECOMMENDED READINGS**

1. Aggrawal, Y. P. (2013). **Statistical Methods: Concepts, Application and Computation**. New Delhi: Sterling Publishers Private Limited.
2. Bless C, Kathuria R. (2001). **Fundamentals of social statistics-An African perspective**. Cape Town: Juta
3. Laake, P., Benestad, H.B., Olsen, B.R. (2007). **Research Methodology in the Medical and Biological Sciences**. Amsterdam: Elsevier.

**COURSE TITLE: CHEMICAL SAFETY AND MANAGEMENT**

**COURSE CODE: CSM311**

**INTRODUCTION**

This course provides students with an understanding of the various concepts in chemical safety and management. It focuses on toxic substances and pesticides and explains the procedures for enforcement of pesticides and toxic substance legislation.

**COURSE AIM**

To enable students demonstrate the knowledge, skills and attitudes in chemical safety and management.

**COURSE OBJECTIVES**

1. Define key concepts in chemical safety.
2. Outline the sources and classification of pesticides and toxic substances
3. Explain key concepts in toxicology
4. Explain the exposure pathways to pesticides and toxic substances
5. Explain the classification of toxic substances according to their sources
6. Explain the classification of pesticides according to use
7. Describe the risks associated with the use of pesticides and toxic substances
8. Recommend appropriate ways of ensuring pesticide and toxic substances safety Enforce pesticides and toxic substance legislation

**COURSE LEARNING OUTCOMES**

1. Apply concepts of chemical safety in the management of chemicals.
2. Classify public health chemicals
3. Classify toxic substances according to their sources.
4. Explain key concepts in toxicology
5. Illustrate the exposure pathways to pesticides and toxic substances
6. State maximum residual limits for pesticides in food
7. Identify risks associated with the use of pesticides and toxic substances
8. Classify pesticides according to use
9. Illustrate the labelling requirements for pesticides and toxic substances in Zambia.
10. Monitor the transportation, storage and disposal of pesticides and toxic substances
11. Conduct compliance monitoring of premises that deals in pesticides and toxic substances
12. Enumerate impacts of pesticides and toxic substances on human health
13. Enforce pesticides and toxic substances legislation
14. Interpret International Conventions and Agreements in pesticides and toxic substances Safety
15. Recommend appropriate ways of ensuring pesticide and toxic substances safety
16. Enforce pesticides and toxic substance legislation

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO CHEMICAL SAFETY**

- 1.1 Introduction to chemical safety
- 1.2 Definition of terms; chemical safety, pesticide, and toxic substance.
- 1.3 History of the use of pesticides; the story of DDT, Minamata disease and Bhopal accident.

### **UNIT 2: SOURCES AND CLASSIFICATION OF PESTICIDES AND TOXIC SUBSTANCES**

- 2.1 Sources of toxic substances: mining industries; chemical industries; pharmaceutical industries; waste disposal industries; manufacturing industries and agro industries.
- 2.2 Classification of toxic substances according to their sources: industrial chemicals; agro chemicals and pharmaceutical chemicals.
- 2.3 Classification of pesticides according to use: insecticides; fungicides; herbicides; plant growth regulators; insect growth regulators; rodenticides; and ovicides.
- 2.4 Classification of public health chemicals:
  - 2.4.1 Insecticides; organophosphates, carbamates, organochlorines, and pyrethroids.
  - 2.4.2 Rodenticides; warfarin, warfarin derivatives, calciferol, fluoroacetates, and metal phosphides.

### **UNIT 3: TOXICOLOGY**

- 3.1 Introduction to Toxicology
  - 3.1.1 Definition of key concepts in toxicology
  - 3.1.2 Dose-response relationship
    - 3.1.2.1 Dose response curve
    - 3.1.2.2 Determination of LD<sub>50</sub>, LC<sub>50</sub>, NOAEL, NOEL and LOEL
- 3.2 Exposure pathways to pesticides and toxic substances:
  - 3.2.1 Definition of exposure;
  - 3.2.2 Routes of exposure to pesticides and toxic substances: inhalation; ingestion; and dermal.
  - 3.2.3 Types of exposure: acute exposure; and chronic exposure

### **UNIT 4: RISKS ASSOCIATED WITH THE USE OF PESTICIDES AND TOXIC SUBSTANCES**

- 4.1 Impacts of pesticides and toxic substances on human health
  - 4.1.1 Effects of pesticides and toxic substances at cellular level
  - 4.1.2 Adverse effects: local or systemic; immediate or delayed; reversible or irreversible; additive or antagonistic or synergistic; potentiation or tolerance or resistance and idiosyncratic reaction
  - 4.1.3 Human health impacts: accumulation in the body; cancer; reproductive toxicity; endocrine toxicity; neurotoxicity; and immunotoxicity
  - 4.1.4 Factors that affect the toxicity of chemical: chemical structure of the chemical; dose; biological activity; route of entry; age; and health status.

- 4.2 Impact of pesticides and toxic substances on the Environment: aquatic toxicity; ground water contamination; effects on wildlife; effects on microbes; bioaccumulation; and biomagnification.
- 4.3 Pesticide residues in food:
  - 4.3.1 Definition of pesticide residues.
  - 4.3.2 Preventive measures to reduce amounts of pesticide residues
  - 4.3.3 Limitations of preventive measures
  - 4.3.4 Setting maximum residue limits for pesticides in food
  - 4.3.5 Maximum residue limits for pesticides in food for Zambia

## **UNIT 5: PESTICIDES AND TOXIC SUBSTANCES SAFETY**

- 5.1 Handling of pesticides and toxic substances
  - 5.1.1 Safety and management: knowledge; and engineering controls
  - 5.1.2 Personal protective equipment in accordance with Regulation 51 (2) of the Environmental Management (Licensing) Regulations of 2013.
- 5.2 Labelling of pesticides and toxic substances
  - 5.2.1 Identification of pesticides: common name or approved name; proprietary name or trade name; active ingredient; formulation; and formulant.
  - 5.2.2 Labelling of pesticides and toxic substances in accordance with the 11<sup>th</sup> schedule of the Environmental Management (Licensing) Regulations of 2013.
  - 5.2.3 Pictograms on containers for pesticides in accordance with the 11<sup>th</sup> schedule of the Environmental Management (Licensing) Regulations of 2013.
  - 5.2.4 Colour coding classification for pesticides in accordance with the 11<sup>th</sup> schedule of the Environmental Management (Licensing) Regulations of 2013.
  - 5.2.5 Importance of Safety Data Sheets for pesticides and toxic substances
- 5.3 Transportation, storage, and disposal options for pesticides and toxic substances
  - 5.3.1 Transportation of pesticides and toxic substances in accordance with the 10<sup>th</sup> Schedule of the Environmental Management (Licensing) Regulations
  - 5.3.2 Storage conditions for pesticides and toxic substances in accordance with the 12<sup>th</sup> Schedule of the Environmental Management (Licensing) Regulations
  - 5.3.3 Disposal options for pesticides and toxic substances in accordance with the 13<sup>th</sup> Schedule of the Environmental Management (Licensing) Regulations

## **UNIT 6: ENFORCEMENT OF PESTICIDES AND TOXIC SUBSTANCES LEGISLATION**

- 6.1 Licensing of pesticides and toxic substances premises in accordance with provisions of the Environmental Management Act of 2011, and Environmental Management (Licensing) Regulations of 2013
- 6.2 Compliance monitoring of pesticides and toxic substances premises
- 6.3 Enforcement of pesticides and toxic substances legislation
- 6.4 International Conventions and Agreements in pesticides and toxic substances safety: the Rotterdam Convention; the Stockholm Convention; the Basel Convention; and the Bamako convention.

## **NOTIONAL HOURS: 90 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Seminar: 1 hour per week
4. Field work: 1 hour per week
5. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Lectures
2. Practical
3. Problem based learning
4. Field visits
5. Group discussions
6. Demonstrations

## **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## **PRESCRIBED READINGS**

1. World Health Organization (2006). **Sound Management of Pesticides**. Geneva: WHO Press
2. World Health Organization (2000). **Hazardous Chemicals in Human and Environmental Health**. Geneva: WHO Press.
3. Government of the Republic of Zambia (2011). **Environmental Management Act of 2011**. Lusaka: Governmental Stores

## **RECOMMENDED READINGS**

1. Government of the Republic of Zambia (2011). **Environmental Management (Licensing) Regulations of 2014**. Lusaka: Governmental Stores
2. FAO (2006). **Guidelines on Compliance and Enforcement of a Pesticide Regulatory Programme**. Rome: FAO Publication.
3. World Health Organization (2013). **Environmental Management (Licensing) Regulations of 2013**. Lusaka: Governmental Stores

**COURSE TITLE: HEALTH-CARE WASTE MANAGEMENT**



## **COURSE CODE: HCW311**

### **INTRODUCTION**

The course is designed to expose students to the management of health-care waste and human remains. The course gives a comprehensive understanding and application of suitable ways of handling these types of wastes including their legislative, regulatory and policy aspects.

### **COURSE AIM**

To enable students acquire knowledge and skills in health care waste and human remains management.

### **COURSE OBJECTIVES**

1. Explain key concepts in health-care waste management
2. Describe health-care waste
3. Elucidate impacts of health-care waste on human health and the environment
4. Outline legal and institutional framework for health-care waste management
5. Describe methods of managing health care waste
6. Explain key concepts in human remains management
7. Describe human remains
8. Describe various methods of human remains management
9. Outline legal and institutional framework for human remains management

### **COURSE LEARNING OUTCOMES**

1. Enforce legislation on health-care waste management
2. Establish health care waste management system for various types of health-care waste facilities
3. Manage treatment and disposal of health-care waste
4. Inspect health-care facilities to ascertain how health-care waste is managed
5. Illustrate health-care minimisation practices
6. Establish occupational health system in a health-care facility
7. Advocate for the implementation of infection prevention and control measures in health-care institutions
8. Plan for health-care waste management
9. Analyse impacts of health-care waste on human health and the environment
10. Monitor the management of health-care waste management plans
11. Evaluate the management of health-care waste management plans
12. Enforce legislation on human remains management
13. Recommend appropriate methods of human remains disposal
14. Set up a human remains management system for a town or city
15. Explain methods of preservation of human remains
16. Inspect mortuaries to ascertain compliance to public health laws
17. Inspect funeral parlours to ascertain their compliance to public health laws
18. Identify methods of transportation of human remains

### **COURSE CONTENT**

## **UNIT 1: HEALTH-CARE WASTE MANAGEMENT**

### **1.1 Definition and characterization of health-care waste:**

- 1.1.1 General definition of healthcare waste
- 1.1.2 Categories of healthcare waste
  - 1.1.2.1 Hazardous health-care waste: sharps waste; infectious waste; pathological waste; pharmaceutical waste; cytotoxic waste; chemical waste; and radioactive waste.
  - 1.1.2.2 Non-hazardous health-care waste

### **1.2 Sources of health-care waste**

- 1.2.1 Major sources of health-care waste
- 1.2.2 Minor sources of health-care waste

### **1.3 Risks associated with health-care waste**

- 1.3.1 Overview of hazards
- 1.3.2 Public sensitivity
- 1.3.3 Public health impact

### **1.4 Legislative, regulatory and policy aspects of health-care waste**

- 1.4.1 Guiding principles: The “polluter pays” principle, The “precautionary” principle; The “duty of care” principle; The “proximity” principle; and The “prior informed consent principle”
- 1.4.2 International agreements and conventions on health-care waste management; the Basel Convention; the Bamako Convention; and the Stockholm Convention.
- 1.4.3 Legal framework for health-care waste management in Zambia
- 1.4.4 Institutional framework for health-care waste management in Zambia

### **1.5 Health-care waste-management planning**

- 1.5.1 The need for health-care waste management planning
- 1.5.2 Development of health-care waste-management plan for a health-care facility
- 1.5.3 Implementation of the health-care waste-management plan

### **1.6 Generation of health-care waste**

### **1.7 Health-care waste minimization, reuse and recycling**

- 1.7.1 Health-care waste minimization
- 1.7.2 Safe reuse of health-care waste
- 1.7.3 Recycling of health-care waste

### **1.8 Segregation, storage and transport of health-care waste**

- 1.8.1 Segregation systems of health-care waste: the practice waste segregation; packaging; colour coding; and labeling.
- 1.8.2 Collection within the health-care facility
- 1.8.3 Onsite transport of health-care waste
- 1.8.4 Central storage inside health-care facilities
- 1.8.5 Offsite transport of health-care waste

### **1.9 Treatment and disposal options for health-care waste**

- 1.9.1 Non incineration treatment options: steam treatment technologies e.g. autoclaves; microwave treatment technologies; dry-heat treatment technologies; chemical treatment technologies; encapsulation and inertization; and land disposal.
- 1.9.2 Incineration treatment options: types of incinerators for health-care waste (dualchamber starved-air incinerators, multiple chamber incinerators, and rotary

kilns); environmental control of incinerators; and applications of treatment and disposal methods to specific health-care waste categories

**1.10 Collection and disposal of health-care wastewater**

**1.11 Health and safety practices for health-care waste workers**

**1.12 Hospital infection prevention and control**

**UNIT 2: HUMAN REMAINS MANAGEMENT**

2.1 Introduction to human remains management

2.2 Objectives of human remains management

2.3 Preservation of human remains: refrigeration; and embalming.

2.4 Mortuary and funeral parlour siting, layout, design and construction requirements

2.5 Transportation of human remains (within a town; between two towns; and from one country to another country).

2.6 Methods of disposal of human remains: burial in the earth; and cremation;

2.7 Disposal of unclaimed bodies

2.8 Disposal of human remains of persons who died from an infectious disease e.g. Ebola.

2.9 Exhuming of human remains

2.10 Legal and institutional framework for human remains management in Zambia

**NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week

2. Tutorial: 1 hour per week

3. Field work: 1 hour per week

4. Assessment and self-study: 1 hour per week

**TEACHING METHODS**

1. Lectures

2. Practical

3. Field visits

4. Group discussions

5. Demonstrations

**ASSESSMENT METHODS**

**1. Continuous assessment 40 %**

1.1 2 Tests 20%

1.2 2 Assignments 10%

1.3 Practical 10%

**2. Final Examinations 60%**

1.1 Theory 40%

1.2 Practical 20%

### **PRESCRIBED READINGS**

1. Environmental Council of Zambia (2007). **Technical Guidelines on Sound Management of Health-care Wastes**. Lusaka: ECZ Publication.
2. World Health Organization (2014). **Safe management of wastes from health-care activities. 2nd edition**. Geneva: WHO press.
3. World Health Organization (2014). **How to conduct safe and dignified burial of a patient who has died from suspected or confirmed Ebola virus disease**. London: World Health Organization.

### **RECOMMENDED READINGS**

1. World Health Organization (2005). **Management of Solid Health-Care Waste at Primary Health-Care Centres**. Geneva: WHO press.
2. Ministry of Health (2015.) **National Health-Care Waste Management Plan 2015 – 2019**. Lusaka: MoH Publication
3. **International Committee of the Red Cross (2011). Medical Waste Management**. Geneva: International Committee of the Red Cross.

**COURSE TITLE: WASTE WATER MANAGEMENT**

**COURSE CODE: WWM311**

**INTRODUCTION**

This course assists the students to develop a framework for understanding wastewater management. This includes wastewater, sewage, storm water and effluent. The course also outlines the legal and institutional framework for wastewater management in Zambia.

**COURSE AIM:**

To equip students with knowledge and skills in wastewater management with a view of minimizing impacts on public health and environment.

**COURSE OBJECTIVES:**

1. Define key concepts used in wastewater management
2. Recommend appropriate sanitary fitments
3. Regulate the construction of drainage systems
4. Describe wastewater quality parameters
5. Inspect waste stabilisation ponds
6. Inspect conventional wastewater treatment process.
7. Monitor wastewater/effluent quality
8. Regulate wastewater use in agriculture.

**COURSE LEARNING OUTCOMES:**

1. Elucidate the Impacts of improperly disposed wastewater on human health and the environment.
2. Explain Legal and institutional framework for wastewater management in Zambia
3. Identify various types of sanitary fitments.
4. Illustrate the design and construction of a proper sanitary fitment
5. Identify different types of drainage systems.
6. Explain principles of sound drainage construction
7. Inspect the drainage systems
8. Test drainages to ascertain their functionality
9. Demonstrate knowledge of Public Health (Drainage and Latrine) Regulations.
10. Describe wastewater quality parameters.
11. Explain how wastewater is treated in waste stabilisation ponds.
12. Describe conventional waste water treatment process.
13. Conduct wastewater/effluent quality monitoring
14. Outline the public health risks associated with wastewater use in agriculture.
15. Demonstrate the knowledge of WHO guidelines for wastewater use in agriculture.
16. Outline the impacts of improperly disposed of trade effluent/industrial wastewater on public health and the environment.
17. Recommend for regulation of wastewater use in agriculture

**COURSE CONTENT**

## **UNIT 1: INTRODUCTION TO WASTE WATER MANAGEMENT**

- 1.1 Definition of key concepts: wastewater, sewage, stormwater and municipal wastewater.
- 1.2 Impacts of improperly disposed-off wastewater on human health and the environment
- 1.3 Legal and institutional framework for wastewater management in Zambia

## **UNIT 2: SANITARY FITMENTS**

- 2.1 Defining a sanitary fitment as per Public Health (Drainage and Latrine) Regulations
- 2.2 Soil water fitments; water closets, slop-hoppers, urinals, and urinettes.
- 2.3 Waste water fitments; baths, lavatory basins, sinks and housemaids' sinks. 2.4 Design and construction of sanitary fitments

## **UNIT 3: WASTE WATER DRAINAGE CONSTRUCTION**

- 3.1 Defining a drainage system as per Public Health (Drainage and Latrine) Regulations
- 3.2 Types of drainage systems: combined drainage system; and separate drainage system.
- 3.3 Principles of sound drainage construction
- 3.4 Access to drainage system; man-holes and inspection chambers
- 3.5 Traps: waste water trap; soil water trap; gully trap; and intercepting trap.
- 3.6 Inspection and testing of drainage systems: water test; coloured water test; air pressure test, smoke test; and ball test.
- 3.7 Regulations on drainages in Zambia - Public Health (Drainage and Latrine) Regulations

## **UNIT 4: WASTE WATER QUALITY PARAMETERS**

- 4.1 Define wastewater quality parameter
- 4.2 Chemicals parameters (BOD, COD, DO, nitrogen, phosphorus, pH)
- 4.3 Physical parameters (turbidity, colour, total dissolved solids, total suspended solids, settleable matter).
- 4.4 Microbiological parameters (E-coli, thermotolerant coliforms and total coliforms).

## **UNIT 5: WASTE STABILIZATION PONDS**

- 5.1 Siting of waste stabilization ponds
- 5.2 Design of waste stabilization ponds
- 5.3 Construction and operation of waste stabilization ponds: anaerobic ponds; facultative ponds; and maturation ponds.

## **UNIT 6: CONVENTIONAL WASTE WATER TREATMENT**

- 6.1 Siting of conventional treatment plant
- 6.2 Stages in conventional wastewater treatment:
  - 6.2.1 Preliminary treatment (screening, comminution, grit chamber and skimming);
  - 6.2.1 Primary sedimentation;
  - 6.2.2 Biological treatment: trickling filters; activated sludge system
  - 6.2.3 Secondary sedimentation; and
  - 6.2.4 Tertiary treatment.
  - 6.2.5 Sludge treatment and disposal

## **UNIT 7: WASTE WATER/EFFLUENT QUALITY MONITORING**

- 7.1 Objectives of wastewater/effluent quality monitoring
- 7.2 Step 1: Develop a wastewater/effluent quality monitoring plan
- 7.3 Step 2: Prepare for sampling
- 7.4 Step 3: Collect samples for laboratory analysis
- 7.5 Step 4: Label and transport samples
- 7.6 Step 5: Laboratory analysis
- 7.7 Step 6: Review results and report

## **UNIT 8: WASTE WATER USE IN AGRICULTURE**

- 8.1 Driving forces to increased use of wastewater in agriculture
- 8.2 Public health risks associated with the use of wastewater in agriculture
- 8.3 Cost-effective strategies for controlling negative public health impacts of wastewater use in agriculture
- 8.4 Wastewater quality monitoring for wastewater meant for use in agriculture:
- 8.5 World Health Organisation (WHO) guidelines for quality of wastewater meant for use in agriculture

### **TEACHING MATERIALS /EQUIPMENT**

1. Sludge sampler
2. Wastewater/effluent sampling kit
3. Protective clothing (Overalls, gloves, musk, helmet and gumboots)
4. Testing kit

### **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/Laboratory work: 1 hour per week
4. Assessment and self-study: 2 hours per week

### **TEACHING METHODS**

1. Lectures
2. Practical
3. Field visits
4. Educational visits
5. Laboratory work

### **ASSESSMENT METHODS**

1. Continuous assessment      **40 %**

1.1	2 Tests	20%
1.2	2 Assignments	10%
1.3	Practical	10%
<b>2.</b>	<b>Final Examinations</b>	<b>60%</b>
2.1	Theory	40%
2.2	Practical	20%

### **PRESCRIBED READINGS**

1. Alley E.R. (2000). **Water quality control handbook**. New York: WEF Press.
2. United States Environmental Protection Agency (2004). **Primer for Municipal Wastewater Treatment Systems**. EPA publication.
3. Joanne E. Drinan, Frank Spellman (2012). **Water and wastewater treatment: a guide for the nonengineering professional**. Florida: CRS Press

### **RECOMMENDED READINGS**

1. Bremen Overseas Research and Development Association (2009). **Decentralised Wastewater Treatment Systems and Sanitation in Developing Countries: A Practical Guide**. Loughborough: WEDC, University of Loughborough.
2. Rukunga, G.K. (2001). **Environmental Health for East Africa**. Nairobi
3. Swiss Federal Institute of Aquatic Science and Technology (2014). **Compendium of Sanitation Systems and Technologies. 2<sup>nd</sup> Edition**. Geneva: Eawag (Sandec).



**COURSE TITLE: GENERAL MEAT PATHOLOGY**

**COURSE CODE: GMP321**

### **INTRODUCTION**

The course equips students with knowledge and skills of identifying physiological and pathological conditions of various animals. The course also provides students with slaughter and meat inspection techniques and how to enforce the laws related to meat inspection.

### **COURSE AIM:**

To equip students with knowledge and skills in general meat pathology

### **COURSE OBJECTIVES:**

1. Describe the slaughter methods applicable in meat technology.
2. State the various physiological and pathological conditions in meat and give correct judgement during meat inspection.
3. Describe various physiological and pathological conditions affecting avian species.
4. Describe various physiological and pathological conditions affecting fin-fish.
5. Explain the terms used in meat pathology
6. Describe slaughter methods applicable to meat technology
7. Describe ante-mortem and post-mortem inspection as applied to various animals
8. Outline the physiological and pathological conditions affecting tissue of food animals
9. Outline the physiological and pathological conditions affecting tissue of poultry and fish
10. Describe the various physiological and pathological conditions of various animals.
11. Describe various pieces of legislations applicable to meat inspection.

### **COURSE LEARNING OUTCOMES:**

1. Demonstrate understanding of meat pathology, meat inspection, ante-mortem and post-mortem
2. Identify physiological and pathological conditions affecting tissue of food animals
3. Identify physiological and pathological conditions affecting tissue of poultry and fish
4. Identify lesions or abnormalities associated with various tissues and organs
5. Elucidate circulatory abnormalities/disturbances and their effects on tissues and organs
6. Identify the carcass based on anatomical knowledge
7. Dress protective clothing when conducting ante mortem and post mortem inspections
8. Conduct ante mortem inspection of food animals
9. Carry out post-mortem inspection of food animals in accordance with the current legislation
10. Conduct emergency slaughter of food animal or avian species and give appropriate judgement
11. Design a data base for the common diseases/conditions available in the area of Jurisdiction
12. Follow the process of the law in confiscating and subsequent condemnation of food animals for disposal
13. Use appropriate slaughter methods applicable in meat technology
14. Compare and contrast humane and ritual methods of slaughter

15. Elucidate precautions taken when infectious disease is suspected
16. Apply precautionary measures when infectious disease is suspected
17. Elucidate the setting of carcasses and its significance
18. Enforce the laws related to meat inspection

## **COURSE CONTENT**

### **UNIT 1: SLAUGHTER AND MEAT INSPECTION TECHNIQUES**

#### **1.1 Pre-slaughter care of food animals and poultry**

#### **1.2 Methods of slaughtering food animals and poultry**

- 1.2.1 Humane methods of slaughter and its significance;
- 1.2.2 Ritual methods of slaughter - Jewish and Mohammedan;
- 1.2.3 Comparing and contrasting humane and ritual methods of slaughter

#### **1.3 Slaughter of game animals**

#### **1.4 Slaughter of poultry**

- 1.4.1 Dressing of carcasses – cattle, small ruminants and pigs;
- 1.4.2 Legislation regarding slaughter of animals and slaughterhouses;

#### **1.5 Meat Inspection**

- 1.5.1 Definition of meat inspection
- 1.5.2 Objectives of meat inspection
- 1.5.3 Types of meat inspections, application and justification

#### **1.6 Ante-mortem inspection**

- 1.6.1 Definition of ante-mortem inspection
- 1.6.2 Objectives of meat inspection and ante-mortem inspection
- 1.6.3 Signs of health, abnormalities and disease in live food animals
- 1.6.4 Decisions made at ante-mortem inspection.
- 1.6.5 Precautions taken when infectious disease is suspected
- 1.6.6 Emergency slaughter and its indications

#### **1.7 Post-mortem inspection:**

- 1.7.1 Definition of post-mortem
- 1.7.2 Objectives of meat inspection; and
- 1.7.3 Terminologies applied in the judgment of meat
- 1.7.4 Identification of the carcass based on anatomical knowledge;
- 1.7.5 Rigor mortis and its significance;
- 1.7.6 Carcass assessment for abnormalities

#### **1.8 Meat Inspection Techniques**

- 1.8.1 The importance of olfaction, observation, palpation and incisions during inspection
- 1.8.2 Inspections procedure of carcass Public Health (Meat, Abattoir and Butcherries) regulations
- 1.8.3 Inspection procedure for Poultry
- 1.8.4 Inspection procedure for fish

### **1.9 Description of lesions in tissue and organs**

- 1.9.1 General description of the lesions
- 1.9.2 Types of judgments.

## **UNIT 2 ABNORMALITIES OF FOOD ANIMALS**

### **2.1 Physiological conditions:**

- 2.1.1 Abnormal odours
- 2.1.2 Abnormal colour
- 2.1.3 Oversticking
- 2.1.4 Suffocation
- 2.1.5 Dry Firm and Dark Cutting meat/Pale Soft Exudate
- 2.1.6 Insufficient bleeding
- 2.1.7 Hypostasis and congestion
- 2.1.8 Immaturity
- 2.1.9 Poorness and leanness;
- 2.1.10 Fatty infiltration;
- 2.1.11 Foetal flesh;
- 2.1.12 Setting of carcasses and its significance; and
- 2.1.13 Cadavers.

### **2.2 General Pathological conditions**

- 2.2.1 Definition of Pathology
- 2.2.2 Branches of pathology

### **2.3 Cell adaptation and response**

- 2.3.1 Degeneration Necrosis
- 2.3.2 Caseation
- 2.3.3 Calcification
- 2.3.4 Infarcts
- 2.3.5 Abscess
- 2.3.6 Oedema

### **2.4 Pigmentations**

- 2.4.1 Jaundice
- 2.4.2 Melanosis

### **2.5 Circulatory disturbances and their effects on tissues and organs:**

- 2.5.1 Embolism

- 2.5.2 Ischaemia
- 2.5.3 Thrombosis

## **2.6 Circulatory conditions:**

- 2.6.1 Anaemia,
- 2.6.2 Haemorrhages
- 2.6.3 Haematomas
- 2.6.4 Aneurysm

## **2.7 Respiratory disturbances**

- 2.7.1 Bronchiectasis
- 2.7.2 Atelectasis
- 2.7.3 Emphysema
- 2.7.4 Pneumonia

## **2.8 Hepatobiliary conditions:**

- 2.8.1 Telangiectasis
- 2.8.2 Cirrhosis
- 2.8.3 Ruptures
- 2.8.4 Gall bladder calculi

## **2.9 Muscular skeletal conditions:**

- 2.9.1 Emaciation
- 2.9.2 Dry Firm and Dark meat (DFD),
- 2.9.3 Pale Soft Exudate
- 2.9.4 Fevered Flesh
- 2.9.5 Gangrene
- 2.9.6 Myopathy

## **2.10 Systemic conditions:**

- 2.10.1 Septicaemia,
- 2.10.2 Toxaemia
- 2.10.3 Pyaemia
- 2.10.4 Viraemia

## **2.11 Renal conditions**

- 2.11.1 Hydronephrosis
- 2.11.2 Urolithiasis

## **2.12 Inflammation and inflammatory conditions**

- 2.12.1 Definitions
- 2.12.2 Cardinal signs of inflammation
- 2.12.3 Classification of inflammation
- 2.12.4 Pattern of inflammation
- 2.12.5 Transudate versus exudate
- 2.12.6 Inflammatory conditions

## **2.13 Traumatic conditions**

- 2.13.1 Injuries
- 2.13.2 Wounds
- 2.13.3 Ulceration and erosions

## **2.14 Malformations**

- 2.14.1 Definition,
- 2.14.2 Classification and causes
- 2.14.3 Effects on tissue

## **2.15 Neoplasia**

- 2.15.1 Definition tumour and neoplasia
- 2.15.2 Basic classification
- 2.15.3 Gross features

## **UNIT 3: ABNORMALITIES OF AVIAN**

- 3.1 Bruises
- 3.2 Fractures
- 3.3 Discolourations
- 3.4 Pigmentations
- 3.5 Abnormal odours
- 3.6 Abscesses
- 3.7 Ascites or Dropsy
- 3.8 Breast blisters
- 3.9 Bumblefoot
- 3.10 Cannibalism
- 3.11 Egg peritonitis
- 3.12 Gout
- 3.13 Fatty Liver Syndrome

## **UNIT 4: ABNORMALITIES OF FISH**

- 4.1 Oedema
- 4.2 Trauma – Sores
- 4.3 Discolourations
- 4.4 Flip over disease
- 4.5 Constipation
- 4.6 Cloudy Eye
- 4.7 Pop Eye (Exophthalmia) Disease
- 4.8 Ammonia Poisoning

## **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical (Abattoir): 3 hours per week
- 4. Assessment and self-study: 1 hour per week

## TEACHING METHODS

1. Lectures
2. Practical
3. Presentations
4. Demonstrations
5. Field visits
6. Group discussions

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. Herenda. D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO Publication.
2. Collins D. S. (2013). **Meat Hygiene**. 10th Edition. WS Saunders.
3. Wilson, W.G. (2005). **Wilson's Practical Meat Inspection**. Oxford: Blackwell publishing

## RECOMMENDED READINGS

1. Sastry, G. A and Rao, P. R. (2002). **Veterinary Pathology**. 7th edition, CBS.
2. Fernandez, P and White, W. (2011). **Atlas of Trans-Boundary Animal Diseases and Animales Trans-fronterizas**
3. Blood, D.C. (2000). **Pocket companion to Veterinary Medicine**. 3<sup>rd</sup> Edition. London: Bailliere Tindall.

## **COURSE TITLE: URBAN HEALTH PRACTICAL**

### **COURSE CODE: UHP331**

#### **INTRODUCTION**

The course will expose students to practical experience in urban areas in order for them to practice the skills they will acquire in various courses which include: disease control, public health administration, water quality monitoring, sanitation, meat inspection, waste management, food safety, pest control and chemical safety, occupational health and safety, town and country planning, building construction.

#### **COURSE AIM**

To enable students demonstrate the application of skills in the running of urban public health services.

#### **COURSE OBJECTIVES**

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

1. Describe strategies of disease control
2. Explain administrative procedures in a public health office
3. Describe the procedure of conducting water surveillance
4. Explain the processes of waste water treatment
5. Describe the procedure of conducting meat inspection
6. Outline the organization and execution of solid waste: collection, transportation and disposal;
7. Describe principles of food safety
8. Describe the safety measures when dealing with chemicals
9. State principles of occupational health risk assessment
10. Describe the strategies for Town and Country Planning

#### **COURSE LEARNING OUTCOMES**

1. Carryout control of communicable disease operations.
2. Conduct inspection of premises
3. Conduct Health Education as a tool in the control of communicable diseases
4. Carry out solid waste management programme
5. Collect water samples for biological and chemical analysis
6. Conduct meat and other foods inspections.
7. Conduct spraying operations
8. Conduct transfer and burial of the dead
9. Conduct a public health cleaning programme
10. Conduct inspection of carcasses for food animals and take appropriate action according to Public Health Act.

11. Take water samples
12. Take waste water and effluent samples
13. Scrutinize building plans
14. Carry out surveillance in water supply, sanitation and sewerage systems
15. Conduct inspection of food premises, rest houses schools, lodges, hotels etc.

## **COURSE CONTENT**

### **UNIT 1: DISEASE CONTROL**

- 1.1 Carry out investigation of notifiable diseases and food poisoning cases including any outbreak of disease;
- 1.2 Participate in disinfecting articles, fabrics, and rooms
- 1.3 Participate in contact tracing for tuberculosis cases
- 1.4 Health Education in the community on prevention of common diseases and personal hygiene;
- 1.5 Participate in the management of epidemics and other disasters.

### **UNIT 2: PUBLIC HEALTH ADMINISTRATION**

#### **2.1 Office Organization and Management:**

- 2.1.1 Perform administrative procedures in a registry of a public health department
- 2.1.2 Participate in filing letters and reports,
- 2.1.3 Attend to office correspondence
- 2.1.4 Prepare daily, weekly, monthly or annual return,
- 2.1.5 Order supplies, and
- 2.1.6 Attend administrative meetings and participate in writing minutes.

#### **2.2 Financial Resources Management:**

- 2.2.1 Attend planning and budgeting meetings at district levels.

#### **2.3 Principles of law:**

- 2.3.1 Attend court sessions at (Subordinate Court, High Court, and Supreme Court).

### **UNIT 3: WATER QUALITY MONITORING**

- 3.1 Inspect water treatment plants and write reports
- 3.2 Collect water samples from water treatment plants, distribution systems, and taps, for bacteriological, chemical and physical analysis and deliver to laboratory
- 3.3 Interpret water quality results

### **UNIT 4: SANITATION**

- 4.1 Inspect a conventional wastewater treatment plant
- 4.2 Inspect waste stabilization ponds
- 4.3 Inspect septic tanks and associated soakways
- 4.4 Collect wastewater/effluent samples and deliver to laboratory
- 4.5 Interpret wastewater/effluent results
- 4.6 Participate in testing drainages
- 4.7 Inspect drainages works



## **UNIT 5: MEAT INSPECTION**

- 5.1 Conduct inspection of slaughter houses;
- 5.2 Conduct ante-mortem and post-mortem inspection of food animals and take appropriate action in accordance with second and third schedules of Public Health (Meat, Abattoir and Butcherries) Regulations.

## **UNIT 6: SOLID WASTE MANAGEMENT**

- 6.1 Participate in organization and execution of refuse collection, transportation and disposal;
- 6.2 Visit the final disposal points and pay much attention to the management of (landfill, open dumping, and others);
- 6.3 Organize and supervise cleaning of streets markets and other public places;
- 6.4 Participate in the transfer and burial of the dead;
- 6.5 Visit cemeteries and paying attention to funerals, management and lay outs;
- 6.6 Participate in health-care waste management

## **UNIT 7: FOOD SAFETY**

- 7.1 Conduct inspections of food premises (food processing plants, bakeries, butcheries, restaurants, hotels, guest houses, lodges, etc) and write reports;
- 7.2 Conduct inspections of food stuffs being offered for sale in supermarkets, shops and other retail outlets.
- 7.3 Collect food samples and take to laboratory
- 7.4 Interpret food quality results and take appropriate action.

## **UNIT 8: PEST CONTROL AND CHEMICAL SAFETY**

### **8.1 Malaria Control:**

- 8.1.1 Conduct malaria survey (entomological survey, and parasitological survey);
- 8.1.2 Spraying techniques (residual spraying, space spraying, and larviciding);
- 8.1.3 Treatment of mosquito nets (preparation of chemicals and treatment of the nets).

### **8.2 Bilharzia Control:**

- 8.2.1 Snail survey;
- 8.2.2 Parasitological survey; and
- 8.2.3 Application of interventions.

### **8.3 Rodent Control:**

- 8.3.1 Selection of sites by conducting rodent survey;
- 8.3.2 Preparation of rodent survey forms; and
- 8.3.3 Pre-baiting and baiting rodents.

### **8.4 Chemical Safety**

- 8.1.1 Inspect premises dealing with chemicals
- 8.1.2 Apply safety measures during mixing of chemicals
- 8.1.3 Participate in the disposal of chemical wastes

## **UNIT 9: OCCUPATIONAL HEALTH AND SAFETY**

- 9.1 Carry out factory inspections to determine (safety and hygiene practices, welfare facilities, health risks resulting from environmental factors, control of pollution in a work place, and enterprise health services).

## **UNIT 10: TOWN AND COUNTRY PLANNING**

- 10.1 Visit the Cartographical department of Local Authorities and Ministry of Lands to study drawings
- 10.2 Visit the Surveying department of Local Authorities and Ministry of Lands to study how physical surveying is carried out.

## **UNIT 11: BUILDING CONSTRUCTION**

- 11.1 Scrutinize building plans
- 11.2 Participate in construction of buildings
- 11.3 Inspect newly constructed buildings and issue occupational certificates
- 11.4 Inspect occupied buildings to ascertain compliance with building regulations
- 11.5 Inspect compounds and other residential areas.

## **NOTIONAL HOURS: 50 HOURS**

1. Tutorial: 1 hour per week
2. Practical/Laboratory work: 1 hour per week
3. Field work: 7 hours per week
4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

1. Group discussions
2. Demonstrations
3. Field visits
4. Practical

## **ASSESSMENT METHODS**

1. Student practical attachment report: 40%
2. Student practical evaluation (Logbook): 60%

## **PRESCRIBED READINGS**

1. Herenda. D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO Publication.
2. Joanne E. Drinan, Frank Spellman (2012). **Water and wastewater treatment: a guide for the nonengineering professional**. Florida: CRS Press
3. Rukunga, G.K. (2001). **Environmental Health for East Africa**, Nairobi

## **RECOMMENDED READINGS**

1. Blood, D.C. (2013). **Pocket companion to Veterinary Medicine. 3<sup>rd</sup> Edition.** London: Bailliere Tindall.
2. Environmental Council of Zambia (2007). **Technical Guidelines on Sound Management of Health-care Wastes.** Lusaka: ECZ Publication.
3. Swiss Federal Institute of Aquatic Science and Technology (2014). **Compendium of Sanitation Systems and Technologies. 2<sup>nd</sup> Edition.** Geneva: Eawag (Sandec).

#### 14.6. THIRD YEAR SECOND SEMESTER COURSES

<b>Course Code</b>	<b>Course Title</b>
INP312	Inspection of Premises
ENE312	Environmental Epidemiology
EPC312	Environmental Monitoring & Pollution Control
OHS312	Occupational Health & Safety
HIS312	Health Management Information System
SMP332	Special Meat Pathology
PMI342	Practical Meat Inspection

**COURSE TITLE: INSPECTIONS OF PREMISES**

**COURSE CODE: INP312**

**INTRODUCTION**

The course is meant to ensure that students acquire knowledge and skills in the inspection of premises of public health importance and write detailed reports. The course will direct the students to the application of public health laws for premises that do not comply with such laws.

**COURSE AIM**

To enable students acquire knowledge and skills in the inspection of premises of public health importance and write detailed reports.

**COURSE OBJECTIVES:**

1. Describe different types of inspections
2. Describe procedures of inspecting premises of public health importance
3. Outline the procedure for abating nuisances arising from trade premises
4. Describe the procedure of inspecting offensive trade premises
5. Describe the anomalies that are associated with offensive trade premises
6. Explain the appropriate action that must be taken when an offensive trade premises is found to be faulty
7. Describe the anomalies that are associated with slaughter houses
8. Outline the procedure of inspecting slaughter houses
9. Outline the procedure of inspecting swimming pools

**COURSE LEARNING OUTCOMES:**

1. Identify types of inspections
2. Conduct inspection of premises in accordance with procedures outlined in Public Health Act, CAP 295 and Food and Drugs Act, CAP 303 of the Laws of Zambia
3. Inspect premises of public health importance to ascertain their compliance to public health laws.
4. Identify the nuisances that fall under common law
5. Apply various techniques available for inspecting trade premises
6. Write reports of inspection of premises of public health importance
7. State public nuisances as provided for in the Public Health Act
8. Control public nuisances as provided for in the Public Health Act
9. Identify various types of offensive trades
10. Inspect offensive trade premises to ascertain their compliance to public health laws
11. Enforce legislation on offensive trades
12. Outline various types of slaughterhouses
13. Inspect slaughterhouses to ascertain their compliance with public health laws
14. Illustrate the design and construction details of swimming pools

15. Inspect swimming pools to ascertain their compliance to public health laws
16. Enforce laws related to inspection of premises

## **COURSE CONTENT**

### **UNIT 1: INSPECTION AND REPORTING PROCEDURES**

- 1.1 The purpose and importance of inspections and reports
- 1.2 Legislation regarding powers of entry
- 1.3 Types of inspections: routine inspection; informal inspection; formal/legal inspections; and inspection on receipt of court order.
- 1.4 Qualities of a good inspector
- 1.5 Techniques of inspections: procedures followed; note taking and standard abbreviations used; sketches and use of photographs; and use of appropriate English.
- 1.6 The inspection rating system of inspections
- 1.7 Inspection of food premises; restaurants, bars and taverns, hotels, lodges, rest houses and hostels, butcheries, bakeries, dairies, and other premises.
- 1.8 Inspection of barbershops and salons
- 1.9 Inspection of public buildings: schools, places of public entertainment and worship

### **UNIT 2: NUISANCES**

- 2.1 Defining nuisances
- 2.2 Common law nuisances (private nuisance, public nuisance, mixed nuisance, and statutory nuisance)
- 2.3 Procedure in dealing with statutory nuisances
- 2.4 Powers of enforcement officers (procedure when entry is refused, certification of the existence of the nuisance, procedure in closing premises, drafting of letters, serving notices, preparation of legal proceedings, and prosecution in court)
- 2.5 Notices (types of notices, draft of notices, service of notices, and procedure when statutory notice is not complied with).
- 2.6 Court orders: definition of court order; legal implication of court order; closing court order; opening court order; and specification of demolition court order.

### **UNIT 3: OFFENSIVE TRADES**

- 3.1 Defining offensive trades
- 3.2 Description of the process and nuisances associated with various offensive trades: bone boiler, soap boiler, tripe boiler, tallow melter and fellmonger.
- 3.3 Important things to be considered in siting of offensive trade premises
- 3.4 Design and construction features for premises meant to be used as offensive trades premises
- 3.5 Hygienic operation of offensive trades to prevent nuisances
- 3.6 Legal provisions on offensive trades in Zambia
- 3.7 Inspection of offensive trades premises

### **UNIT 4: SLAUGHTER HOUSES**

- 4.1 Defining slaughterhouses
- 4.2 Nuisances associated with slaughterhouses

- 4.3 Siting of slaughterhouses
- 4.4 Design, layout, and construction of slaughterhouses
- 4.5 Management of slaughterhouses: clean; and unclean operations
- 4.6 Prevention of nuisances in slaughterhouses.
- 4.7 Inspection of slaughterhouses

## **UNIT 5: SWIMMING POOLS**

- 5.1 Defining swimming pools
- 5.2 Public health hazards and risks associated with swimming pools
- 5.3 Types, layout and designs of swimming pools
- 5.4 Water treatment: Sources, filtration, sterilization, chemical adjustment, chlorine and pH level, clarity
- 5.5 Ancillary facilities to be provided: sanitary accommodation, change rooms, showers, footbaths, drainage, water supply and testing equipment.
- 5.6 Management of swimming pools: Safety rules, qualified supervision, safety equipment, records of water monitoring
- 5.7 Inspection of swimming pools

## **NOTIONAL HOURS: 90 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Field work: 3 hours per week
- 4. Assessment and self-study: 1 hour per week

## **TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Field visits
- 4. Group discussions
- 5. Demonstrations

## **ASSESSMENT METHODS**

- |                                 |             |
|---------------------------------|-------------|
| <b>1. Continuous assessment</b> | <b>40 %</b> |
| 1.1 2 Tests                     | 20%         |
| 1.2 2 Assignments               | 10%         |
| 1.3 Practical                   | 10%         |
| <b>2. Final Examinations</b>    | <b>60%</b>  |
| 2.1 Theory                      | 40%         |
| 2.2 Practical                   | 20%         |

### **PRESCRIBED READINGS**

1. Bassett W.H. (2007). **Environmental health procedures**. New York: Taylor & Francis
2. Bassett W.H. (2004). **Clay's Handbook of Environmental Health**. London: Spon Press
3. World Health Organisation (2006). **Guidelines for safe recreational water environments. Volume 2, Swimming pools and similar environments**. Geneva: WHO Press.

### **RECOMMENDED READINGS**

1. Herenda, D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO.
2. World Health Organisation (2000). **Monitoring Bathing Waters - A Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes**. Geneva: WHO Press.
3. Collins D. S. (2013). **Meat Hygiene**. 10th Edition. London: WS Saunders.



**COURSE TITLE: ENVIRONMENTAL EPIDEMIOLOGY**

**COURSE CODE: ENE312**

### **INTRODUCTION**

The course focuses on the principles of environmental epidemiology, its practical applications for investigation of public health problems, planning, implementation and evaluation of intervention strategies to deal with environmental challenges.

### **COURSE AIM**

To equip students with knowledge and skills in environmental epidemiology

### **COURSE OBJECTIVES**

1. Describe the scope of environmental epidemiology
2. Explain key concepts used in epidemiology
3. Discuss measures of frequency of health events
4. Explain exposure assessment and estimations
5. Describe environmental risk assessment procedure
6. Describe health effects due to exposure to environmental factors
7. Discuss epidemiological studies

### **COURSE LEARNING OUTCOMES**

1. Elucidate the significance of epidemiology studies
2. Explain environmental epidemiology and related sciences
3. Explain the history of environmental epidemiology
4. Conduct environmental surveillance for data collection
5. Calculate measures of health in populations
6. Interpret measures of health in populations
7. Compare the different exposure assessment techniques.
8. Characterize environmental health impacts and their advantages and disadvantages.
9. Integrate the disciplines of exposure assessment to quantify environmental health risks.
10. Conduct risk assessment in different settings
11. Conduct epidemiologic studies
12. Recognize relationships between the environment and human health
13. Identify the risk factors during an epidemic
14. Characterize the associations between causal factors and health outcome of a particular epidemic

### **COURSE CONTENT**

#### **UNIT 1: INTRODUCTION TO EPIDEMIOLOGY:**

- 1.1 Definition of epidemiology
- 1.2 Uses of epidemiology
- 1.3 Branches of epidemiology: clinical epidemiology; environmental epidemiology; and occupational epidemiology

- 1.4 Definition, history and development of environmental epidemiology
- 1.5 Functions of environmental epidemiology;

**UNIT 2: CONCEPTS USED IN EPIDEMIOLOGY:**

- 2.1 Sufficient and necessary factors
- 2.2 Dynamics of disease transmission
- 2.3 Modes of transmission (direct and indirect transmission)
- 2.4 The epidemiologic triad of disease
  - 2.4.1 Host factors (Age, social status, lifestyle, and psychological status)
  - 2.4.2 Agent factor (Bacteria, virus, protozoa, fungus, parasite)
  - 2.4.3 Environmental factors (Biological, chemical, physical, psychological)

**UNIT 3: MEASURES OF FREQUENCY OF HEALTH EVENTS:**

- 3.1 Ratio, proportion and rates;
- 3.2 Fertility rates
  - 3.2.1 Birth rate;
  - 3.2.2 General fertility rate
  - 3.2.3 Age specific rate
- 3.3 Measures of morbidity
  - 3.3.1 Incidence rate
  - 3.3.2 Prevalence rate
  - 3.3.3 Attack rate
- 3.4 Measures of mortality
  - 3.4.1 Crude mortality rate
  - 3.4.2 Infant mortality rate
  - 3.4.3 Case fatality rate
  - 3.4.4 Proportionate mortality
- 3.5 Demography

**UNIT 4: EXPOSURE ASSESSMENT AND ESTIMATIONS**

- 4.1 Concept of exposure assessment
- 4.2 Exposure pathways and media
- 4.3 Dose (administered dose, absorbed dose or up take dose, and active or biological effective dose);
- 4.4 Multiple exposure factors;
- 4.5 Interactive effects;
- 4.6 Environmental monitoring of exposure;
- 4.7 Biological monitoring of exposure
- 4.8 Sources of data for exposure estimates

**UNIT 5: ENVIRONMENTAL RISK ASSESSMENT:**

- 5.1 Concepts used in risk assessment
- 5.2 Risk assessment procedure
  - 5.2.1 Hazard identification
  - 5.2.2 Exposure assessment
  - 5.2.3 Dose response relationship

- 5.2.4 Risk characterization.
- 5.2.5 Risk management and communication

**UNIT 6: HEALTH EFFECTS DUE TO EXPOSURE TO ENVIRONMENTAL FACTORS:**

- 6.1 Gastrointestinal effects
- 6.2 Respiratory effects
- 6.3 Reproductive effects
- 6.4 Neurological disorders
- 6.5 Cancers

**UNIT 7: EPIDEMIOLOGICAL STUDIES:**

- 7.1 Descriptive studies
- 7.2 Analytical studies
- 7.3 Experimental studies

**NOTIONAL HOURS: 80 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Field work: 1 hour per week
- 4. Assessment and self-study: 1 hour per week

**TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Group presentations
- 4. Case studies
- 5. Field trips

**ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

**PRESCRIBED READINGS**

- 1. Merrill R.M. (2008). **Environmental epidemiology: principles and methods.** Massachusetts: Jones & Bartlett
- 2. World Health Organisation (2006). **Basic Epidemiology.** Geneva: WHO Press. Also available at: [http://apps.who.int/iris/bitstream/10665/43541/1/9241547073\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/43541/1/9241547073_eng.pdf)

3. Irene A. Kreis, I.A., Busby, A., Leonardi, G., Meara, J., and Murray, V. (2012). **Essentials of environmental epidemiology for health protection: a handbook for field professionals**. Oxford: Oxford University Press

#### **RECOMMENDED READINGS**

1. Carr, S., Unwin, N and TanjaPless, M. (2007). **An introduction to Public Health and Epidemiology**. London: Open University Press.
2. London School of Hygiene & Tropical Medicine (2006). **Environmental Epidemiology**, London: University Open Press.
3. Roger R.D. Peng and Dominici F. (2008). **Statistical methods for environmental epidemiology**. New York: Springer-Verlag

## **COURSE TITLE: ENVIRONMENTAL MONITORING AND POLLUTION CONTROL**

**COURSE CODE: EMPC312**

### **INTRODUCTION**

The course provides students with an understanding of environmental monitoring and pollution control. The students will be made to demonstrate the knowledge, skills and attitudes in specific areas of environmental monitoring and pollution control, and be able to enforce environmental management laws.

### **COURSE AIM**

To enable students demonstrate the knowledge, skills and attitudes in environmental monitoring and pollution control.

### **COURSE OBJECTIVES**

1. Explain key concepts used environment monitoring and pollution control.
2. Describe the causes, effects and control measures of water pollution.
3. Explain the causes, effects and control measures of air pollution
4. Explain the causes, effects and control measures of soil pollution
5. Describe the causes, effects and control measures for noise pollution.
6. Describe the human health hazards associated with radiations
7. Describe current environmental issues
8. Describe the role of environmental education in environmental management.
9. Discuss strategic environmental assessment

### **COURSE LEARNING OUTCOMES**

1. Identify the Links between environmental pollution and health
2. Explain key concepts used environment monitoring and pollution control.
3. Enforce environmental management laws
4. Describe international conventions and protocols in environmental management.
5. Categorize pollutants
6. Categorize types of pollution
7. Describe the causes, effects and control measures of water pollution.
8. Explain the causes, effects and control measures of air pollution.
9. Explain the causes, effects and control measures of soil pollution.
10. Describe the causes, effects and control measures for noise pollution.
11. Describe the human health hazards associated with ionising radiations.
12. Describe the role of environmental education in environmental management.
13. State the objectives of environmental impact assessment.
14. Outline the stages involved in strategic environmental assessment in Zambia.
15. Explain the importance of public involvement in environmental impact assessment
16. Evaluate environmental impact assessment reports
17. Conduct impact management and monitoring
18. Characterize the association between environmental pollution and the health outcomes
19. Identify various forms pollutants may take

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION:**

- 1.1 Definition of the following terms: environment; environmental monitoring; pollution; and pollution control.
- 1.2 Legal and institutional framework for environmental management in Zambia
- 1.3 International conventions and protocols in environmental management: Rotterdam Convention; Stockholm Convention; and Basel convention
- 1.4 Categories of pollutants:
  - 1.4.1 point sources; and
  - 1.4.2 non-point sources
- 1.5 Types of pollution: water pollution; air pollution; soil pollution, noise pollution and radiation hazards.

### **UNIT 2: WATER POLLUTION**

- 2.1 Definition of water pollution
- 2.2 Sources of water pollution
  - 2.2.1 Point sources
  - 2.2.2 Non-point sources
- 2.3 Categories of water pollutants
- 2.4 Effects of water pollution on human health and the environment
- 2.5 Water quality monitoring
- 2.6 Water pollution control

### **UNIT 3: AIR POLLUTION**

- 3.1 Definition of air pollution
- 3.2 Primary and secondary air pollutants
- 3.3 Potential causes of air pollution
- 3.4 Sources and effects of air pollution on human health and the environment
  - 3.4.1 Carbon monoxide
  - 3.4.2 Ground-level ozone
  - 3.4.3 Lead
  - 3.4.4 Sulphur dioxide
  - 3.4.5 Particulate matter
  - 3.4.6 Nitrogen dioxide
  - 3.4.7 Dust fall
- 3.5 Air quality monitoring
- 3.6 Air pollution control

### **UNIT 4: SOIL POLLUTION**

- 4.1 Definition of soil pollution,
- 4.2 Potential causes of soil pollution,

- 4.3 Effects of soil pollution on human health and the environment
- 4.4 Soil quality monitoring
- 4.5 Soil pollution control

#### **UNIT 5: NOISE POLLUTION**

- 5.1 Definition of noise pollution
- 5.2 Causes of noise pollution
- 5.3 Effects of noise pollution on human health and the environment
- 5.4 Methods of detecting and measuring noise pollution
- 5.5 Noise pollution control

#### **UNIT 6: RADIATION HAZARDS**

- 6.1 Definition of radiation
- 6.2 Use of radiation rays
- 6.3 Types of radiations
- 6.4 Nature and properties of ionising radiations
- 6.5 Hazards associated with ionising radiations on human health and the environment
- 6.6 Monitoring ionising radiations
- 6.7 Control of ionising radiation hazards

#### **UNIT 7: CURRENT ENVIRONMENTAL ISSUES**

##### **7.1 Ozone layer depletion**

- 7.1.1 Definition of ozone layer
- 7.1.2 Causes of ozone layer depletion
- 7.1.3 Effects of ozone layer depletion on human health and the environment
- 7.1.4 Mitigation measures against ozone layer depletion

##### **7.2 Acid rain**

- 7.2.1 Introduction
- 7.2.2 Causes of acid rain
- 7.2.3 Effects of acid rain on human health and the environment
- 7.2.4 Preventing acid rain

##### **7.3 Climate change and public health**

- 7.3.1 Introduction to climate change
- 7.3.2 Natural greenhouse effect and enhanced greenhouse effect
- 7.3.3 Impacts of climate change on human health
- 7.3.4 Mitigation and adaptation to climate change

#### **UNIT 8: ENVIRONMENTAL EDUCATION**

- 8.1 Definition and scope of environmental education
- 8.2 The role of environmental education in environmental management.

#### **UNIT 9: STRATEGIC ENVIRONMENTAL ASSESSMENT**

- 9.1 Defining strategic environmental assessment and environmental impact assessment
- 9.2 Aims/objectives of environmental impact assessment

- 9.3 Environmental impact assessment practice step-by-step
- 9.4 Public involvement in environmental impact assessment

### **NOTIONAL HOURS: 100 HOURS**

- 1. Lectures: 3 hours per week
- 2. Tutorial: 1 hour per week
- 3. Practical/Laboratory work: 1 hour per week
- 4. Field work: 2 hours per week
- 5. Assessment and self-study: 1 hour per week

### **TEACHING METHODS**

- 1. Lectures
- 2. Practical
- 3. Group discussions
- 4. Field visits

### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### **PRESCRIBED READINGS**

- 1. Farmer, A. (2002). **Managing Environmental Pollution**, Routledge, New York.
- 2. UNEP (2004). **Environmental Impact Assessment and Strategic Environmental Assessment: Towards an Integrated Approach**. Geneva: UNEP.
- 3. Wright, R.T., and Boorse, D.F. (2011). **Environmental Science: Toward a Sustainable Future**. Boston: Pearson Education,

### **RECOMMENDED READINGS**

- 1. The Royal Society of Chemistry (2001). **Pollution: Causes, Effects and Control**. Fourth Edition. Cambridge: The Royal Society of Chemistry.
- 2. Cheremisin N.P. (2001). **Handbook of Pollution Prevention Practices**. New York: Marcel Dekker, Inc.
- 3. Republic of Zambia (2008) **Integrated Water Resources Management and Water Efficiency**. Lusaka: Ministry of Energy and Water Development.



**COURSE TITLE: OCCUPATIONAL HEALTH AND SAFETY**

**COURSE CODE: OHS312**

### **INTRODUCTION**

The course assists students to acquire knowledge and skills of identifying occupational hazards in work places. The students will also be able to explain the implementation of occupational health and safety regulations and be equipped with critical skills to enforce legal requirements related to occupational health. Additionally, students will be provided with skills in first aid so that they can be able to assess the risk of injuries or illnesses from work places.

### **COURSE AIM**

To equip students with knowledge and skills of occupational health in the workplace setting.

### **COURSE OBJECTIVES**

1. Implement appropriate control measures including compliance with regulatory requirements to prevent or minimise the risks in a work place for the benefit of the worker and the enterprise
2. Classify occupational hazards and risks and outline their sources and effects on a worker
3. Discuss various types of accidents
4. and injuries in relation to causes, control and prevention at a work place
5. Discuss diseases associated with
6. various occupations including health institutions by outlining the mechanisms of their control in order to guarantee safety and health of the workers
7. Conduct occupational health services and risk assessment in an enterprise in order to establish the safety of the work place
8. Discuss occupational health and Safety services that enterprises are mandated to implement at a work place
9. Apply relevant legislation related to Occupational safety and health for compliance to guarantee health and safety at a work place

### **COURSE LEARNING OUTCOMES**

1. Classify hazards, accidents and control measures in the work place.
2. Record keeping of statistical occupational health data within the area of operation
3. Use the various monitoring instruments in occupational health and safety
4. Conduct routine inspections of work places
5. Enforce legal requirements related to occupational health
6. Perform the process of risk assessment
7. Determine the level of worker's exposure to hazards
8. Monitor enterprises to ensure that they prove compliance with regulatory requirements
9. Assess the risk of injury or illness from work places.
10. Describe the methods used in the control of dust in a work place
11. Implement appropriate control measures to prevent or minimise the risks in a work place.
12. Analyse workplace incident, accident, injury and illness data
13. Enforce the implementation of occupational health and safety regulations

14. Characterize risk factors associated with work environments that generate high temperatures
15. Use the heat index chart in the work environment to determine the temperatures under which workers are exposed to.
16. Elucidate the effects associated with the presence of vapours, fumes, gases and mists in a work environment
17. Enforce the occupational health and Safety services that enterprises are mandated to implement at a work place
18. Monitor enterprises to ensure that management provide occupational health and safety Guidelines for workers in a work place

## **COURSE CONTENT**

### **UNIT 1: INRODUCTION TO OCCUPATIONAL HEALTH AND SAFETY**

#### **1.1 Introduction**

- 1.1.1 Definition of Occupation health, Occupational safety, Occupational hygiene;
- 1.1.2 Aims of occupational health
- 1.1.3 Functions of occupational health;
- 1.1.4 Importance of occupational health.

#### **1.2 Occupational health hazards and health effects**

- 1.2.1 Define a risk and hazard
- 1.2.2 Chemical hazards;
- 1.2.3 Physical hazards;
- 1.2.4 Biological hazards;
- 1.2.5 Mechanical hazards;
- 1.2.6 Ergonomic hazards and
- 1.2.7 Psycho-social hazards
- 1.2.8 Hierarchy of control of hazards

#### **1.3 Accidents:**

- 1.3.1 Define types of accidents
- 1.3.2 Describe fires, explosions and toxic chemical release
- 1.3.3 Causes, control and prevention of accidents
- 1.3.4 Explore incidences and statistic reports of accidents

#### **1.4 Diseases Associated with Occupations:**

- 1.4.1 Diseases in agriculture and livestock industry
  - 1.4.1.1 Anthrax
  - 1.4.1.2 Brucellosis
  - 1.4.1.3 Rabies
  - 1.4.1.4 Leptospirosis

#### **1.4.2 Mineral dust diseases in related occupations:**

- 1.4.2.1 Pneumonconioses: Asbestosis; Silicosis; and Bagassosis, Byssinosis

- 1.4.2.2 Mesothelioma,
- 1.4.2.3 Occupational bronchitis
- 1.4.2.4 Emphysema
- 1.4.2.5 Asthma,
- 1.4.2.6 Extrinsic allergic alveolitis.

### **1.4.3 Management of specific occupational health hazards and risks in a work place**

- 1.4.3.1 Heat stress
- 1.4.3.2 Dust from different occupations (constructional works, agricultural works – cotton dust)
- 1.4.3.3 Noise
- 1.4.3.4 Vapours
- 1.4.3.5 Fumes
- 1.4.3.6 Mists
- 1.4.3.7 Gases

### **1.4.4 Occupational diseases associated with healthcare institutions: Nosocomial infections**

- 1.4.4.1 Hepatitis B & C
- 1.4.4.2 Tuberculosis
- 1.4.4.3 Human Immuno- Deficiency Virus/Acquired Immune Deficiency Syndrome

### **1.4.5 Occupational dermatoses**

- 1.4.5.1 Irritant contact dermatitis
- 1.4.5.2 Skin cancers
- 1.4.5.3 Skin infections
- 1.4.5.4 Other miscellaneous skin diseases

## **UNIT 2: OCCUPATIONAL HEALTH INSPECTIONS AND RISK ASSESSMENT**

### **2.1. Factory and workplace inspections:**

- 2.1.1. Carryout walkthrough surveys of factory and workplace
- 2.1.2. Compilation of factory and workplace inspection records

### **2.2. Basic outline of occupational risk assessment and monitoring devices**

- 2.2.1. Definition of risk assessment
- 2.2.2. Process of conducting risk assessment
- 2.2.3. Types of exposure limits
- 2.2.4. Interpretation of exposure limits in relation to risk assessment
- 2.2.5. Types and use of monitoring instruments in risk assessment

### **2.3. Basic principles of disaster management:**

- 2.3.1. Definition of a disaster
- 2.3.2. Disaster management cycle
  - 2.3.2.1. Mitigation
  - 2.3.2.2. Preparedness

- 2.3.2.3. Response and
- 2.3.2.4. Recovery

### **UNIT 3: OCCUPATIONAL HEALTH SERVICES**

#### **3.1. Occupational health services at work place:**

- 3.1.1 Tasks of enterprise health services;
- 3.1.2 Health checks and investigations;
- 3.1.3 Safety and hygiene practices;
- 3.1.4 Welfare facilities;
- 3.1.5 Personal Protection Equipment

### **UNIT 4: RELATED LAWS AND REGULATIONS**

#### **4.1. Interpretation of laws and standards in occupational health and safety**

- 4.1.1. Occupational Health and Safety Act 36 of 2010
- 4.1.2. Factories Act Cap 441
- 4.1.3. Town and Country Planning Act Cap 283 of 1995
- 4.1.4. Mines and Minerals Act 213
- 4.1.5. Workers Compensation Act Cap 271
- 4.1.6. Zambia Environmental Management Act of 2011
- 4.1.7. Relevant international laws and interpretation National Institute of Occupational Safety and Health, Occupational Safety and Health Administration, Occupational Health and Safety Act, American Conference of Government Industrial and Hygienists, Health and Safety Executive, International Labour Organisation
- 4.1.8. Zambia Bureau of Standards, International Standards Organisation Standards related to occupational health

### **MATERIALS/ EQUIPMENT**

1. Personal protective equipment- goggles, ear muffs, masks, overall, helmet, safety boots, gumboots, gloves.
2. Indoor air quality meter
3. Personal dust exposure monitor
4. Integrating environmental sound level meter
5. Accuro hand pump – acid mist sampler
6. Gas sampling pump
7. dBadge micro noise dosimeter
8. Thermometer
9. Luxmeter

### **NOTIONAL HOURS: 100 HOURS**

1. Lectures: 3 hours per week
2. Tutorial: 1 hour per week
3. Practical/Laboratory work: 1 hour per week
4. Field work: 2 hours per week
5. Assessment and self-study: 1 hour per week

## TEACHING METHODS

1. Lectures
2. Practical
3. Demonstrations
4. Field visits
5. Group discussions

## ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

## PRESCRIBED READINGS

1. Alli, B. (2008). **Fundamental Principles of Occupational Health and Safety**. 2<sup>nd</sup> edition. Geneva: International Labour Organisation Publication
2. Guild, R. et al editors (2001). **Handbook of occupational health practice in the South African mining industry**. Johannesburg: SIMRAC. ISBN 1 – 919853 – 02 – 2
3. Afubwa, S. O. and Mwanthi, M. A. (2014). **Environmental Health and Occupational Health and Safety**. Nairobi: Acrocodile Publishing.

## RECOMMENDED READINGS

1. Ministry of Labour (2015). **A Guide Occupational Health and Safety Act**. Ontario: Queens Printer.
2. International Labour Organization (2012). **Encyclopedia of Occupation Health and Safety**. 4<sup>th</sup>/ online edition. 4 Vols.
3. Guild, R. et al editors (2001). **Handbook of occupational health practice in the South African mining industry**. Johannesburg: SIMRAC. ISBN 1 – 919853 – 02 – 2

**COURSE TITLE: HEALTH MANAGEMENT INFORMATION SYSTEM**

**COURSE CODE: HIS312**

### **INTRODUCTION**

This course provides students with background knowledge of information management and its application in the health sector.

### **COURSE AIM**

To equip students with knowledge and skills in data handling, analysis, interpretation and presentation for delivery of quality health services

### **COURSE OBJECTIVES**

1. Equip the student with background knowledge of information management in the health sector.
2. Discuss the various principles of data collection
3. Describe tools used at each stage of the information cycle in collecting quality data.
4. Illustrate various ways in which data can be produced and processed
5. Describe ways in which quality data can be assured
6. Discuss data security and personal health information
7. Equip the student with background knowledge and skills of data analysis
8. Equip the learner with knowledge and skills of presenting data using various methods according to the nature of the data
9. Equip learners with skills of interpreting information effectively
10. Discuss data submission in context with feedback mechanisms.
11. Enable learners to demonstrate the ability to set realistic goals, objectives and targets in the management and planning/decision making, the implementation, monitoring and evaluation of operational plans.
12. Describe SmartCare application as a tool for generating reports, produce graphs and maps
13. Equip the learners with knowledge of interpreting laws and regulations related to health information management.

### **COURSE LEARNING OUTCOMES**

1. Apply principles of information management at any level.
2. Use appropriate tools for data collection in the information cycle.
3. Demonstrate methods of data collation and processing.
4. Identify appropriate indicators for each programme
5. Use indicators in the planning cycle and epidemiological studies
6. Apply standard formulas for data analysis and Interpret data correctly for decision making processes.
7. Utilizes appropriate performance indicators for measuring staff work performance/and or self-assessment.
8. Prepare reports based on data collected
9. Present data using various methods according to the nature of the data
10. Use SmartCare for in-putting the collected data

11. Implement security measures for authority of access to data
12. Employ regulations on access and disclosure of personal health information in a health Facility
13. Monitor the operationalization of set goals, objectives and targets in the management and planning/decision making
14. Evaluate from time to time the set goals, objectives and targets in the management and planning/decision making
15. Demonstrate the ability to set realistic goals, objectives and targets in the management and planning/decision making, the implementation, monitoring and evaluation of operational plans.
16. Develop action plan based on health information
17. Apply tools used at each stage of the information cycle in collecting quality data.
18. Operate SmartCare system to improve the quality of health services.

## **COURSE CONTENT**

### **UNIT 1: INTRODUCTION TO HMIS/DHIS**

- 1.1 Definition of terms
- 1.2 Introduction to Management Information system
- 1.3 Zambia Health Information System (HMIS) Health information
- 1.4 District Health Information System design and principles
- 1.5 Information use in Community diagnosis

### **UNIT 2: DATA PRODUCTION**

- 2.1 Data collection
- 2.2 Introduction to the principles of Information
- 2.3 The Six 'Ws' principles of data collection The Information cycle

### **UNIT 3: USE OF DATA COLLECTION TOOLS**

- 3.1 Data definitions
- 3.2 Sources of data
- 3.3 Types of HMIS tools and their purposes
- 3.4 The Information Cycle: Core elements and linkages
- 3.5 Tools and outputs of each element/stage
- 3.6 Data sets for health facility
- 3.7 Essential data sets
- 3.8 Information Pyramid

### **UNIT 4: DATA PRODUCTION AND PROCESSING**

- 4.1 Introduction
- 4.2 Aggregation of data
- 4.3 Conditions for efficient and correct data collection
- 4.4 Roles and responsibilities of health worker in data collection and processing
- 4.5 Data flow policy
- 4.6 Use of lifelong records.

### **UNIT 5: DATA QUALITY**

- 5.1 Definition of quality
- 5.2 Importance of good data quality (3 Cs)
- 5.3 Legal and professional ethical requirements
- 5.4 Standards and standard operating procedures
- 5.5 Mechanisms for assessing data quality (Validations).
- 5.6 Assessment of data quality in health facilities
- 5.7 Supervisory roles in data quality
- 5.8 Common problems with data quality.
- 5.9 Typical problems in work environment and workflow actions to common problems

## **UNIT 6: DATA SECURITY, LEGAL AND ETHICAL ASPECTS**

- 6.1 Security measures for authority of access
- 6.2 Prevention of destruction of data, (i.e. by moisture, insects, computer viruses, destruction of digital media,) or incompatibility of old and new computer systems.
- 6.3 Storage
  - 6.3.1 Privacy protection/Confidentiality
  - 6.3.2 Timeliness for archiving and retrieval of health data (HMIS data / Health records, Signature lists, etc)

## **UNIT 7 DATA ANALYSIS**

- 7.3 Introduction to data analysis
- 7.4 Terms used in data analyses: Meaning and use
- 7.5 Indicator concepts
  - 7.5.1 Ideal indicators (RAVES)
  - 7.5.2 Types of indicators (Qualitative and Quantitative)
- 7.6 Epidemiological concepts in data analyses
- 7.7 Measurement and calculation formulas
- 7.8 Formulation of indicators for specific programs
- 7.9 The risks of data manipulation

## **UNIT 8: PRESENTATION OF DATA**

- 8.1 Rationale for appropriate presentation of data
- 8.2 Presentation of data in simple tables
- 8.3 Types of graphs to present various types of data
- 8.4 Design of appropriate graphs for display of data
- 8.5 Practical on generation of various data presentation graphs

## **UNIT 9: INTERPRETATION OF INFORMATION**

- 9.1 Data handling processes for interpretation.
- 9.2 Factors influencing the interpretation of information
- 9.3 Preparation for interpretation: Essential ingredients
- 9.4 Interpretation as a tool in decision-making

## **UNIT 10: FEEDBACK ON DATA**

- 10.1 Rationale for feedback.



- 10.2 Mechanisms for giving and receiving feedback: CRISP
- 10.3 Data flow policy and feedback mechanism
- 10.4 Strategies for appropriate feedback
- 10.5 Presentation of benchmark results
- 10.6 Feedback and staff motivation

**UNIT 11: INFORMATION USE**

- 11.1 Types of action plans in the health sector
- 11.2 Elements of action plans
- 11.3 Planning and management:
- 11.4 Baseline surveys
- 11.5 Indicators as link between planning and Planning cycle
- 11.6 Monitoring & Evaluation
  - 11.6.1 Definitions
  - 11.6.2 Types of monitoring
  - 11.6.3 Types of evaluation
  - 11.6.4 Importance of M & E in Project management/cycle

**UNIT 12: HEALTH INFORMATICS (SMARTCARE)**

- 12.1 Introduction to SmartCare
- 12.2 Definition of terms
- 12.3 Equipment used in SmartCare
- 12.4 Security system
- 12.5 Understanding clients' records/personal health information
- 12.6 SmartCare services and running reports

**UNIT 13: LEGAL REQUIREMENTS**

- 13.1 Public Health Act Sec. 9 and 10
- 13.2 ICT policy (2009)

**MATERIALS /EQUIPMENT**

- 1. Computers
- 2. Calculators

**NOTIONAL HOURS: 70 HOURS**

- 1. Lectures: 3 hours per week
- 2. Practical/Laboratory work: 1 hour per week
- 3. Field work: 1 hour per week
- 4. Assessment and self-study: 1 hour per week

**TEACHING METHODS**

- 1. Lectures

2. Practicals
3. Demonstrations
4. Field visits
5. Group discussions

#### **ASSESSMENT METHODS**

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignments	10%
1.3 Practical (computer lab)	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

#### **PRESCRIBED READINGS**

2. Heywood, A. and Rohde, J. (2003). **Using Information for Action: A manual for Health Workers at facility level, Equity Project.** Cape Town: Belleville
3. Ministry of Health (2008). **HMIS Procedures Manual.** Lusaka: MoH publications
4. Ministry of Health (2007). **DHIS 1.4 Operations Manual.** Lusaka: MoH publications

#### **RECOMMENDED READINGS**

1. World Health Organization (2004). **Developing Health Management Information Systems: A practical guide for developing countries.** Geneva: WHO Press
2. Glaser, J.P., Lee, F.W., and Wager, K.A. (2013). **Health care information systems: a practical approach for health care management.** San Francisco: Jossey-Bass
3. SmartCare Job Aids (2013). **Introduction to SmartCare.** Lusaka: JHPIEGO.

**COURSE NAME: SPECIAL MEAT PATHOLOGY**

## **COURSE CODE: SMP332**

### **INTRODUCTION**

The course is designed to equip students with knowledge, skills and attitudes necessary to diagnose and manage common human pathogenic infections. The course will also enlighten students on various statutory provisions (legal requirements) relating to meat, poultry and fish diseases.

### **COURSE AIM:**

The course equips the student with knowledge, skills and attitude to diagnose and manage common zoonotic and non-zoonotic infections that affect humans

### **COURSE OBJECTIVES:**

1. Define important concepts in meat pathology
2. Describe diseases caused by bacteria.
3. Describe diseases caused by viruses
4. Describe diseases caused by fungi, mycoplasma, prions and rickettsiae
5. Describe diseases caused by helminthes
6. Describe diseases caused by protozoa
7. Describe diseases caused by arthropods
8. Explain the diseases affecting poultry
9. Explain the diseases affecting fish
10. Describe the various methods used in the disposal of condemned meat
11. Explain the various pieces of legislation related to meat inspection and animal handling

### **COURSE LEARNING OUTCOMES:**

1. Identify zoonotic diseases
2. Classify zoonotic diseases of animal origin.
3. Tabulate the effects of zoonoses in animal and human populations.
4. Illustrate the life cycles of various parasitic diseases
5. Describe the role of a Health Inspector in the control of zoonotic diseases.
6. Elucidate the public health significance of Zoonotic Diseases.
7. Conduct ante-mortem inspection of food animals, poultry and fish
8. Demonstrate ability to manage suspected and confirmed zoonotic disease during meat inspection.
9. Provide appropriate and timely information when a notifiable disease is suspected/ confirmed.
10. Illustrate various parasitic infections
11. Notify relevant authorities on the outbreak of zoonotic diseases
12. Recommend appropriate measures for prevention and control of zoonotic diseases.
13. Inspect carcasses of food animals and take appropriate action.
14. Dispose suspected/confirmed meat or meat by products in accordance with the Public Health Act CAP 295 of the Laws of Zambia.
15. Document important ante-mortem findings of various diseases of food animals, poultry and fish.

16. Document important post-mortem findings of various diseases of food animals, poultry and fish
17. Enforce legislation relating to meat, poultry and fish diseases

## **COURSE CONTENT:**

### **UNIT 1: INTRODUCTION:**

- 1.1 Definition of zoonosis.
- 1.2 Classification of zoonotic diseases of animal origin.
- 1.3 Effects of zoonotic diseases.
- 1.4 Role of the meat inspector in the prevention of zoonotic diseases.
- 1.5 Public health importance of zoonoses.

### **UNIT 2: DISEASES CAUSED BY BACTERIA:**

- 2.1 Anthrax;
- 2.2 Tuberculosis;
- 2.3 Johnes Disease
- 2.4 Brucellosis;
- 2.5 Actinobacillosis;
- 2.6 Actinomycosis;
- 2.7 Blackleg;
- 2.8 Tetanus;
- 2.9 Caseoushyphadenitis;
- 2.10 Johnne's disease; and
- 2.11 Swine erysipelas.
- 2.12 Streptothricosis (Senkobo).
- 2.13 Salmomelosis.
- 2.14 Botulism.
- 2.15 Haemorrhagic Septicaemia.
- 2.16 Leptospirosis.

### **UNIT 3: DISEASES CAUSED BY VIRUSES:**

- 3.1 Foot and Mouth Disease;
- 3.2 African Swine Fever;
- 3.3 Lumpy Skin Disease; and
- 3.4 Swine fever.
- 3.5 Malignant Catarrhal Fever (MCF)
- 3.6 Bovine Viral Diarrhoea (BVD)
- 3.7 Peste des pestisruminante (Goat plague)

### **UNIT 4: DISEASES CAUSED BY FUNGI, MYCOPLASMA, PRIONS AND RICKETTSIAE:**

- 4.1 Dermatophytosis
- 4.2 Contagious bovine Pleuro-pneumonia; and
- 4.3 Anaplasmosis
- 4.4 Cowdriosis

4.5 Bovine Spongiform Encephalopathy (BSE, “Mad Cow Disease”)

**UNIT 5: DISEASES CAUSED BY HELMINTHS:**

- 5.1 Ascariasis (Milk Spots)
- 5.2 Trichinosis
- 5.3 Oestrophagostomiasis (Pimply gut)
- 5.4 Cysticercosis (Bovine and Porcine Measles)
- 5.5 Ecchinococosis (Hydatidosis)
- 5.6 Fasciolasis;
- 5.7 Paramphistomosis;
- 5.8 Stilesia hepatica infection.

**UNIT 6: DISEASES CAUSED BY PROTOZOA:**

- 6.1 Babesiosis (red water fever);
- 6.2 Trypanosomosis;
- 6.3 Theileriosis; and
- 6.4 Sarcocysts / Sarcosporidiosis.

**UNIT 7: DISEASES CAUSED BY ARTHROPODS:**

**7.1 Important Vectors of Animal Diseases:**

- 7.1.1 Ticks
- 7.1.2 Mites

**UNIT 8: POULTRY DISEASES:**

**8.1 Diseases Caused by Bacteria:**

- 8.1.1 Bacillary White Diarrhoea (Pullorum disease).
- 8.1.2 Fowl typhoid
- 8.1.3 Air Sacculitis
- 8.1.4 Fowl Typhoid
- 8.1.5 Coli Septicaemia
- 8.1.6 Gangrenous Dermatitis

**8.2 Diseases Caused by Viruses**

- 8.2.1 Avian Influenza -H5N1
- 8.2.2 Newcastle
- 8.2.3 Infectious Bursal Disease (Gumboro)
- 8.2.4 Fowl pox
- 8.2.5 Mareks Disease (Fowl Paralysis)
- 8.2.6 Avian Leucosis Complex

**8.3 Diseases Caused by Parasites (Helminths, Protozoa & Arthropods)**

- 8.3.1 Gapes (Infectious Bronchitis)
- 8.3.2 Coccidiosis
- 8.3.3 Red mite (Dermanyssusgallinae) Infestation

## **8.4 Diseases Caused by Fungi**

8.4.1 Aspergillosis

8.4.2 Aflatoxicosis

## **UNIT 9: Fish Diseases:**

### **9.1 Diseases Caused by Bacteria:**

9.1.1 Furunculosis

9.1.2 Haemorrhagic Septicaemia

9.1.3 Aeromonads Punctata

9.1.4 Vibriosis

9.1.5 Fish Tuberculosis

9.1.6 Finrot

### **9.2 Diseases Caused by Viruses**

9.2.1 Infectious Pancreatic Necrosis (IPN)

9.2.2 Fish Pox

9.2.3 Viral Hemorrhagic Septicemia

### **9.3 Diseases Caused by Parasites (Helminths & Protozoa)**

9.3.1 White Spot Disease (Ich)

9.3.2 Black Spot Disease (Diplostomiasis)

## **UNIT 10: DISPOSAL OF CONDEMNED MEAT:**

### **10.1 Definitions:**

### **10.2 Classification of disposal methods**

10.2.1 Economic (Transformation, Rendering)

10.2.2 Non-economic (Burying, incineration, dumping)

## **UNIT 11: STATUTORY PROVISIONS (LEGAL REQUIREMENTS):**

11.1 Public Health Act Cap 295 of the Laws of Zambia;

11.1.1 Public Health (Meat, Abattoir and Butchery) Regulations;

11.1.2 Public Health (Transport of Meat) Regulations;

11.2 Prevention of Cruelty to Animals Act;

11.3 Export of Pigs Act Cap 246

11.4 Food and Drugs Act 303; and

11.5 Animal Health Act number 27 of 2010 repealed Stock Diseases Act 265.

11.6 Local Government Act

## **NOTIONAL HOURS: 80 HOURS**

1. Lectures: 3 hours per week

2. Tutorial: 1 hour per week
3. Field work (Abattoir/Butchery): 1 hour per week
4. Assessment and self-study: 1 hour per week

### TEACHING METHODS

1. Lectures
2. Practical
3. Demonstrations
4. Field visits
5. Group discussions
6. Problem Based Learning (PBL)

### ASSESSMENT METHODS

<b>1. Continuous assessment</b>	<b>40 %</b>
1.1 2 Tests	20%
1.2 2 Assignment	10%
1.3 Practical	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Theory	40%
2.2 Practical	20%

### PRESCRIBED READINGS

1. Herenda. D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO.
2. Collins D. S. (2013). **Meat Hygiene**. 10th Edition. WS Saunders.
3. Wilson, W.G. (2005) **Wilson's Practical Meat Inspection**. Oxford: Blackwell publishing.

### RECOMMENDED READINGS

1. Sastry, G. A and Rao, P. R. (2002). **Veterinary Pathology**. 7th edition. CBS Publications.
2. Fernandez, P and White, W. (2011). **Atlas of Trans-boundary Animal Diseases and Animales Trans-fronterizas**
3. Blood, D.C. (2000). **Pocket companion to Veterinary Medicine**. London: BailliereTindall.

**COURSE TITLE: PRACTICAL MEAT INSPECTION**

## **COURSE CODE: PMI342**

### **INTRODUCTION**

The course is designed to equip students with practical skills in meat inspection. The course will also enlighten students on various statutory provisions (legal requirements) relating to inspection of meat, poultry and fish.

### **COURSE AIM:**

To equip students with all skills and knowledge relevant to meat inspection

### **COURSE OBJECTIVES:**

1. Demonstrate an understanding of the importance of personal protective equipment and personal hygiene in meat inspection
2. Describe anatomy and physiology of food animals paying particular attention to lymphatic system
3. Demonstrate an understanding of gross/comparative anatomy of food animals
4. Demonstrate an understanding of the important physiological and pathological conditions related to tissues and organs of food animals including poultry and fish
5. Outline procedure of conducting antemortem and postmortem inspections of various animal species
6. Outline the important antemortem and postmortem findings
7. State the decisions made at each inspection conducted

### **COURSE LEARNING OUTCOMES:**

1. Utilise PPEs and practice hygiene during meat inspection
2. Locate key lymph nodes during meat inspection
3. Identify tissues and organs of various animal species
4. Distinguish tissues and organs of various animal species
5. Conduct antemortem and postmortem inspection
6. Apply olfaction, observation, palpation and incision techniques to meat inspection
7. Recognise conditions associated with tissues and organs
8. Identify lesions associated with tissues and organs
9. Differentiate zoonotic and non-zoonotic diseases and
10. Demonstrate ability to notify authorities regarding notifiable zoonotic diseases of meat origin
11. Make reasonable judgement in accordance with relevant legislation
12. Identify appropriate methods of disposing the condemned carcasses or part thereof
13. Outline procedure of disposing condemned carcasses or part thereof
14. Advise on the appropriate method of disposing the condemned carcasses or part thereof



## **COURSE CONTENT**

### **UNIT 1: PERSONAL PROTECTIVE EQUIPMENT AND HYGIENE**

- 1.1 Definition Personal Protective Equipment (PPEs), Personnel Hygiene and Habits
- 1.2 Characteristics of ideal PPEs for a meat inspector
- 1.3 Considerations for personal hygiene
- 1.4 Importance of PPEs and personnel
- 1.5 Unsanitary habits

### **UNIT 2: LYMPHATIC SYSTEM**

- 2.1 Definitions
- 2.2 importance of the lymphatic system
- 2.3 Lymph glands drainage areas
- 2.4 Location and lymph gland linkages
- 2.5 Cardinal lymph nodes in meat inspection

### **UNIT 3: GROSS COMPARATIVE ANATOMY**

- 3.1 Definitions
- 3.2 Importance of comparative anatomy
- 3.3 Tissue and organ recognition based on knowledge of anatomy
- 3.4 Comparative anatomy

### **UNIT 4: MEAT INSPECTION TECHNIQUES**

#### **4.1 Antemortem inspection**

- 4.1.1 Definition
- 4.1.2 Objectives
- 4.1.3 Signs of health, abnormalities and disease in live food animals
- 4.1.4 Description of lesions
- 4.1.5 Antemortem inspection and techniques applied
- 4.1.6 Decisions made at antemortem
- 4.1.6 Precautions to be taken when an infectious disease is suspected
- 4.1.7 Procedure for handling a cadaver
- 4.1.8 Indications for emergency slaughter

#### **4.2 Post-mortem inspection**

- 4.2.1 Definition
- 4.2.2 Objectives
  - 4.2.2.1 Carcasses identification (Age – Horns, Teeth, Bone structure, Sex – pelvic girdle)
  - 4.2.2.2 Recognition and description of lesions - Tissue or organ abnormalities comparable to normal
  - 4.2.2.3 Decisions made at or during postmortem
  - 4.2.2.4 Rigor mortis and setting of the carcass
  - 4.2.2.5 Postmortem inspection and techniques applied

## UNIT 5: LEGISLATION

- 5.1 Definition of law, legislation, jurisprudence
- 5.2 Importance of legislation in meat inspection
- 5.3 Administration of legislation in meat inspection
- 5.4 Common pieces of legislation applicable in meat inspection
  - 5.4.1 Public Health Act, CAP 295 (Meat, Abattoir and Butcheries) Regulations
  - 5.4.2 Food and Drugs Act Cap 303 (pending repeal **Food Safety Bill**)
  - 5.4.3 Animal Health Act No. 27 of 2010 formerly Stock Diseases Act Cap 265

### NOTIONAL HOURS: 70 HOURS

- 1. Tutorial: 1 hour per week
- 2. Practical (Abattoir): 10 hours per week
- 3. Assessment and self-study: 1 hour per week

### TEACHING METHODS

- 1. Practical instructions in the abattoir/butchery
- 2. Demonstrations

### ASSESSMENT METHODS

<b>2. Continuous assessment</b>	<b>40 %</b>
1.1 Practical	20%
1.2 Field Practical report	10%
1.3 Presentation	10%
<b>2. Final Examinations</b>	<b>60%</b>
2.1 Practical	40%
2.2 Orals	20%

### PRESCRIBED READINGS

- 1. Herenda, D. (2011). **Manual on meat inspection for developing countries**. Rome: FAO.
- 2. Collins D. S. (2013). **Meat Hygiene. 10th Edition**. WS Saunders.
- 3. Wilson, W.G. (2005). **Wilson's Practical Meat Inspection**. Oxford: Blackwell Publishing.

### RECOMMENDED READINGS

- 1. Sastry, G. A and Rao, P. R. (2002). **Veterinary Pathology**. 7<sup>th</sup> Edition. CBS Publications.
- 2. Fernandez, P and White, W. (2011). **Atlas of Trans-Boundary Animal Diseases and Animales Trans-fronterizas**
- 3. Blood, D.C. (2000). **Pocket companion to Veterinary Medicine**. London: BailliereTindall.

