ZAMBIA COLLEGE OF MEDICINE & SURGERY

Advancing Specialist Care & Professional Growth

Specialty Training Programme

Curriculum & learning guide

for

PUBLIC HEALTH

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GENERAL INTRODUCTION

This Curriculum and Learning Guide describes the work-based competence-based professional training programme for the Specialty Training Programme (STP) in Public Health (PH) in Zambia. The intended readership for the curriculum and guideline include the following:

- Trainees, host departments and managers of PH healthcare services;
- STP PH trainers, which includes all those involved in supervising, coordinating, assessing and delivering specialist education and training in Public Health;
- Academic, administrative and professional staff within Higher Education Institutions (HEIs), the Higher Education Authority (HEA), and the Zambia Qualifications Authority (ZAQA);
- Strategic partners involved in supporting eye care and the training of healthcare practitioners in these related fields.

Zambia College of Medicine and Surgery (ZACOMS) advances professional training of medical specialists using the professional competence-based certification model beyond traditional university-based specialist training. It promotes specialist training as a vital pursuit for a successful professional medical career. The ZACOMS also promotes the increase of universal health coverage (UHC) by promoting equitable access to cost-effective quality specialist care as close to the family as possible for people in Zambia at all levels of socioeconomic status and geographical location. The ZACOMS certifies and admits members and/or fellows as specialists in a medical and/or surgical specialty in any of the various specializations of medicine and surgery.

The Zambia College of Medicine and Surgery (ZACOMS) oversees the training of Public Health specialists working through the Zambia National Public Health Institute (ZNPHI).

The STP PH training provides specialist training in Public Health. This is a relevant programme because of the critical shortage of Public Health specialists and the important role these specialists play in national health security and health system management. The STP PH will equip trainees with core competencies reflecting the wide array of specialties.

This will mean for every trainee who completes this programme, the population they serve will have gained access to a doctor with various competencies in Public Health. Furthermore, the graduate of this programme will offer support to the various medical and surgical specialties, improving health outcomes by adding Public Health strategies to efforts focused on management of a broad spectrum of pathology.

Vision

Our vision is to be innovative in providing a teaching and support structure that will empower every trainee to excel in Public Health knowledge, skills and research through internal and external collaboration.

Mission Statement

The mission of the STP PH training in Zambia is to train specialists who shall endeavour to improve the public health care services to all by providing safe, evidence-based, humanistic specialist care in the field of Public Health in an efficient and proficient manner to meet the needs of the Zambian community, and contribute to the field of Public Health in the region and globally.

Values:

- Professional excellence
- Integrity
- Sensitivity to reproductive health needs
- Interdisciplinary, inter institutional collaboration
- Continuous professional development
- Innovation
- Academic Excellence
- Self and peer review

RATIONALE FOR THE SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH

The STP PH aims to train specialists in Public Health in order to prepare them for specialist service in the healthcare service. The STP PH aims to bridge the critical shortage of Public Health specialists by advancing professional training of Public Health specialists using the competence-based certification model beyond traditional university-based specialist training. Simply put, this model works on the principle that every health facility equipped well enough to support a Public Health practice has the basic requirements to train a Public Health specialist. The curriculum is informed by the training requirements of the Health Professions Council of Zambia (HPCZ), the professional creed of the Zambia National Public Health Institute (ZNPHI) and is alive to the unique opportunities obtaining across the various training sites. The training programme encourages self-directed learning, life-long learning, and student-centred approaches while providing robust and structured guidance.

The key outcomes are twofold as stipulated in Outcomes 1 and 2 below:

Outcome 1. <u>Show Mastery of and Apply the Sound Scientific Principles in the Practice of Public Health</u>

1. The graduate should be able to demonstrate a thorough understanding of the basic scientific principles that underpin the effective practice of Public Health including but not limited to the following:
    a) The core functions of Public Health:
        i. **Assessment**: collecting and analysing information about health problems.
        ii. **Policy Development**: How to conduct broad-based consultations with stakeholders to weigh available information and decide which interventions are most appropriate and ensure that the public interest is served by measures that are adopted.
        iii. **Assurance**: Promoting and protecting public interests through programmes, events, campaigns, regulations and other strategies, and making sure that necessary services are provided to reach agreed upon goals.

b) The ten essential services of Public Health:

i. Monitor health status to identify community health problems.

ii. Diagnose and investigate health problems and health hazards in the community.

iii. Inform, educate, and empower people about health issues.

iv. Mobilize community partnerships to identify and solve health problems.

v. Develop policies and plans that support individual and community health efforts.

vi. Enforce laws and regulations that protect health and ensure safety.

vii. Link people to needed health services and assure the provision of health care when otherwise unavailable.

viii. Assure a competent public health and personal healthcare workforce.

ix. Evaluate effectiveness, accessibility, and quality of personal and population based health services.

x. Research for new insights and innovative solutions to health problems.

Outcome 2. Competence, at specialist level, in Public Health Clinical Practice.

On successful completion of the work-based STP, trainees:

1. The candidate should exhibit expertise in the practice of Public Health with due regard to the context, and underpinned by a broad based knowledge, skills and experience.
2. The candidate should exhibit professional attributes and temperament necessary for independent practice and to be an effective public health practitioner.
3. The candidate should be able to undertake complex public health roles and show that they can define public health problems and choose logical methods of investigation, process complex facts and make professional judgments.
4. The candidate should exhibit a clear understanding of scientific concepts that underpin the practice of public health, and show the attribute to apply scientific concepts in the practice of public health.

The outcomes of the STP PH training are affiliated to the following curriculum outcome categories:

Category I: Scientific foundations

Goal 1: Understand the normal structure and function of the human body, at all levels from molecules to cells to organs, to the whole organism.

Goal 2: Understand the major pathological processes and their biological alterations.

Goal 3: Understand how the major pathologic processes affect the organ systems.

Goal 4: Analyse the relationship between social determinants of health and population health.

Goal 5: Understand the principles of scientific method and evidence-based public health including critical thinking.

Category II: Prevention

Goal 6: Develop knowledge, skills, and attitudes to practice the basic principles of disease prevention.

Goal 7: Practice custom-made public health planning for long-range goals for the population.

Goal 8: Understand the planning for the health of communities and societies.

Category III: Communication and Interpersonal Skills

Goal 9: Develop the knowledge, skills, and attitudes needed for culturally-competent care for communities and society.

Goal 10: Create and sustain a professionally and ethically sound relationship with communities in which one operates.

Goal 11: Work effectively with other providers in the health system.

Goal 12: Clearly communicate public health information in spoken and written form.

Category IV: Information Management

Goal 13: Use information and educational technology to facilitate research, education, and patient care.

Category V: Ethics, Humanities, and the Law

Goal 14: Develop a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to diversity.

Goal 15: Develop a critical understanding of the multiple factors that affect the practice of public health and research.

Goal 16: Incorporate ethical principles in public health practice and research.

Category VI: Professionalism

Goal 17: Develop healthy self-care behaviours and coping skills.

Goal 18: Responsiveness to the needs of communities and society.

Goal 19: Understanding of legal and regulatory requirements, as well as the appropriate role of the public health practitioner.

Goal 20: Accountability to communities, society and the profession.

Category VII: Leadership & Management

Goal 21: Develop interpersonal and communication skills that result in leadership in public health service delivery and health human resource management.

ADMISSION CRITERIA TO THE SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH

All applicants to the STP PH must possess a primary qualification in medicine, that is, Bachelor of Medicine and Bachelor of Surgery (MB ChB) or equivalent, from a recognized university. Additionally they must have completed internship and retain full registration and a practising licence issued by the Health Professions Council of

Zambia. Other Ministry of Health policies and directives, for example, completion of rural posting, may also apply.

In addition to the above guidelines, for one to be admitted into the STP PH of the Zambia College of Medicine and Surgery offered in conjunction with the Zambia National Public Health Institute, they will either follow the direct or indirect entry pathway−depending on the candidate's prior qualification or experience in Public Health as outlined below:

A. Direct Entry:

Candidates, who possess a basic medical degree (MBChB) and seek to be admitted into the Public Health Fellowship Training Programme, will be required to:

i. Have a minimum of eighteen (18) months experience in public health;

ii. Take requisite modular courses in Public Health offered by the Zambia College of Medicine and Surgery (ZACOMS) through the Zambia National Public Health Institute (ZNPHI).

iii. Have met all other Ministry of Health requirements for undertaking post-graduate training (e.g. have served the required number of years post qualification and have successfully completed rural postings or attachments)

B. Indirect Entry:

Candidates who wish to be admitted to the Public Health Fellowship Training Programme through the indirect entry pathway will be required to hold a Master's degree in Public Health (MPH), Master of Science (MSc) in Epidemiology or Field Epidemiology− or any related field which the Zambia College of Medicine and Surgery will deem equivalent to these qualifications. These candidates will not be required to take the modular courses in Public Health offered by the Zambia College of Public Health. They will be required to indicate beforehand the topic of the research they intend to conduct for their dissertation as part of their enrolment application.

CURRICULUM DESIGN/MODEL OF THE SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH

The STP PH Curriculum is a work-based professional competence-based training situated in an accredited training facility managed by specialists in Public Health with oversight by the Zambia College of Medicine and Surgery (ZACOMS) working through the Zambia National Public Health Institute (ZNPHI). This curriculum is based on a process model of curriculum and is designed to be flexible and open ended rather than predetermined; maximizing the potential for growth and development.

During the STP PH programme, the specialty registrar is an integral member of the Public Health department in which they are training to gain the required Public Health experience and competence. The STP PH programme is a work based professional competence-based training leading to the award of the Certificate of Completion of Specialty Training (CCST) by the Zambia College of Medicine and Surgery (ZACOMS). Graduates are then eligible to apply to the Health Professions Council of Zambia to enter the Specialist Register in Public Health.

Year 1 Modular Courses

The modular courses will be offered in a didactic manner and will comprise modules in:

1. Principles of Public Health
2. Determinants of Health
3. Biostatistics
4. Epidemiology
5. Introduction to Health Systems
6. Disease Prevention and Control
7. Sexual and Reproductive health rights
8. Environmental Health
9. Health Promotion
10. Health Planning
11. Research Methods
12. Health Economics, Policy and Financing
13. Management and Leadership

In addition to taking the modular courses, Trainees on the STP PH programme will in the last 6 months of their year 1 be required to identify a topic for research. This is the topic they will build into a research project/ dissertation in their year 2 of training.

Part 1 Examinations

To be admitted into the Public Health Fellowship Training Programme, candidates who are admitted through the direct entry pathway will be required to take and pass the Part 1 examinations that will be offered by the Zambia College of Medicine and Surgery working through the Zambia National Public Health Institute (ZNPHI).

The Part 1 examination is designed to:

- Test the candidate's level of knowledge and understanding of the scientific basis of Public Health
- Assess the candidates' ability to apply their knowledge and skills to the practice of Public Health
- Test the candidate's ability to extract, process and present health data
- Test the candidate's ability to understand and criticize research evidence
- Test the candidate's ability to communicate to a non-specialist audience in writing

In addition to passing the Part 1 examination, progression to second year will also depend on having a research topic approved by the faculty.

Fellowship Training Programme

After taking and passing the Part 1 examination or having entered the programme as indirect entrants, candidates will be assigned to field placement sites for one (1) year. Each candidate will be assigned a field placement supervisor, mentor and a technical advisor. During this 12 months fellowship programme, candidates will be required to:

- Rotate through field sites offering different public health programmes and services
- Work under a supervisor and mentor
- Write a research proposal
- Conduct a research on a topic of interest

- Undergo training in use of statistical soft packages
- Analyse, write a thesis and present their research findings
- Attend and take part in workshops, scientific conferences and symposia

Year 2 First Quarter

- Field placement and rotation
- Build research topic into a proposal
- Research proposal writing
    - Problem statement
    - Literature review and study justification
- Proposal presentation to ethics review committee
- Mentorship sessions

Year 2 Second Quarter

- Field placement and rotation
- Data collection
- Mentorship sessions

Year 2 Third Quarter

- Field placement and rotation
- Data analysis
- Thesis dissertation writing
- Mentorship sessions

Year 2 Fourth Quarter

- Attend and take part in workshops, scientific conferences and symposia
- Thesis dissertation presentation and defence
- Exit examination

TEACHING METHODS IN THE SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH

The STP PH training is a work-based professional competence-based programme and should encompass diverse teaching and learning approaches that are appropriate for the target educational domain, i.e., cognitive (knowledge), psychomotor (practical), or affective (attitude) domain. The teaching methods may include, but not limited to, the following: expository lectures, tutorials, seminars, practical classes, field and community based learning, and ICT supported learning experiences.

The Health Professions Council of Zambia (HPCZ) Specialty Training Guidelines for Zambia and the Zambia College of Medicine and Surgery (ZACOMS) Society Objectives and By-Laws provide detailed guidance to the trainee about the STP and ZACOMS, respectively.

SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH CURRICULUM STRUCTURE AND MAP

STP YEAR 1 (12 months)	ZACOMS PT 1	STP YEAR 2 (3 months)	Annual Review	STP YEAR 2 (3 months)	Annual Review	STP YEAR 2 (3 months)	Annual Review	STP YEAR 2 (3 months)	ZACOMS CCST Thesis Defense
1. Principles of Public Health 2. Determinants of Health 3. Biostatistics 4. Epidemiology 5. Introduction to Health Systems 6. Disease Prevention and Control 7. Sexual and Reproductive health rights 8. Environmental Health 9. Health Promotion 10. Health Planning 11. Health Economics, Policy and Financing 12. Research Methods		Field Placement and Rotation		Data Collection for Research Project		Field Placement and Rotation		Field Placement and Rotation	
		1. Research Proposal Writing • Problem Statement • Literature Review • Study Justification		Relevant Rotations		Mentorship Session Take Part in Workshops, Scientific conferences and symposia		Thesis dissertation presentation and defense	
		• Proposal presentation to ethics review committee • Workshop and symposia		• Mentorship Sessions • Workshop & Symposiat		Thesis writing		Exit Examination	
Identify Research Topic (6 months)		Part 2: Specialist Training & Field Placement (1 Year)							
Part 1: Basic Training in Public Health & Epidemiology (1 year)									

Curriculum Map for the STP PH Programme

ASSESSMENT IN THE SPECIALTY TRAINING PROGRAMME IN PUBLIC HEALTH

Progression of the candidate from one stage of the training to the next is neither automatic nor guaranteed. It is dependent upon the candidate demonstrating that he/she has spent the required amount of time and met all the required competencies at each defined stage of the training. At each stage, the candidate will be assessed for an understanding of the both the scientific basis of the practice of Public Health and necessary skills to be effective. Therefore, the candidate's assessment will consist in both their performance at their placement sites as well as written and oral examinations.

Each designated training site will use a valid standard method of assessing the candidate's knowledge, clinical skills and attitude domains. Progression will depend on the candidate scoring a passing mark in each of the components individually and not an overall pass mark. For progression to the next stage of training, the candidate's placement site work assessment will be weighted at 60% of the total assessment and the written assessments at 40%.Varied assessment methods will be used. These will include, but will not be limited to, the following:

- Reports undertaken and completed
- Project reports
- Multiple choice questions
- Essay questions
- Short answer questions
- Modified essay questions
- Objective structured clinical examinations (OSCE)
- Objective structured practical examinations (OSPE)
- Viva Voce

While the number of attempts a candidate may make at Part 1 are unlimited, the candidate shall be allowed a maximum of three attempts only at Part 2. Examinations: Candidates must have completed all their deliverables before they can sit the Part 2 examination.

As required by the HPCZ, for the duration of the training, all candidates will be registered with ZACOMS and ZNPHI for the duration of their training.

Grading Scheme

The STP PH Curriculum and Guide are the basis for all specialty training assessment. They will be used to assess the standards of proficiency set down by the Zambia College of Medicine and Surgery (ZACOMS) in conjunction with the Zambia National Public Health Institute (ZNPHI). The Certificate of Completion of Specialist Training (CCST) is not graded. Separate assessments and examinations may be graded to show the level of achievement of the trainee in a particular course or assignment.

Separate assessments and examinations may be graded to show the level of achievement of the trainee in each of the particular aspects of course or assignment. These include but are not limited to achievements during rotations, written reports or specific assignments and deliverables.

There are a number of domains in which the candidates are expected to show proficiency. Amongst these, candidates will be expected to be competent and take part in, and lead in a field investigations in response to an acute public health problem. The candidates are required to show leadership by taking the lead in at least three (3) response to incidences of public health importance. As leaders in the response, the candidates will be expected to constitute teams, lead the design of the strategy for the response, come up with the budget and coordinate the response at all levels, including, but not limited to the political or jurisdiction aspects of the response like arranging for meetings with the necessary authorities at district, provincial or national level for the response to be successful. Candidates will further be expected to be responsible and lead the writing up of the response report complete with problem statement, methods, findings, discussion and recommendations.

Candidates will also be required to show proficiency in carrying out a planned epidemiologic study to answer a public health question. During this process, the candidates will be expected to identify the question to be answered, design a protocol and carry out data collection. The candidate will further be expected to analyse the data, with the appropriate tools, and write up in a logical, methodical and systematic manner a dissertation worthy of a specialist in Public Health. This will constitute the candidates dissertation which is also a prerequisite for sitting the part 2 (or exit) examination.

Candidates will also be expected to show proficiency in conducting Public Health surveillance and in reviewing surveillance systems. The candidate will be required to either review or design a surveillance system. Candidates will also be expected to show proficiency in communication by writing manuscripts, and giving oral and poster presentations at conferences. Candidates will be further assessed on their Management and quality improvement skills

Assessment of Attainment of Competence in an Academic Subject

Status & Level	Description of Competence Features	% Range
Outright Fail [D]	• Has poor and inaccurate command of the subject vocabulary • Has poor and inaccurate command of the concepts (knowledge, skills and attitudes) of the subject across a broad range of topics.	44.9% & Below
Bare Fail [D+]	• Has the basics of subject vocabulary • Has the basics of concepts (knowledge, skills and attitudes) of the subject across a broad range of topics • Unable to transfer and apply knowledge, skills and attitudes of the subject in a range of situations. • Unable to exercise independent judgement in a range of situations	45 – 49.9

Clear Pass [C]	• Has sound command of subject vocabulary • Has sound command of concepts (knowledge, skills and attitudes) of the subject across a broad range of topics • Able to formulate responses and demonstrate skill and exhibit appropriate attitude in well-defined and abstract problems/professional settings across a broad range of topics of the subject	50 – 64.9
Meritorious Pass [B]	All of above in level 3 and: □ Able to transfer and apply knowledge, skills and attitudes and exercise significant independent judgement in a broad range of topics of the subject	65 – 74.9
Distinction Pass [A]	All of the above in level 4 and: □ Displays masterly of complex and specialised areas of knowledge, skills and attitudes in a broad range of topics of the subject.	75% & Above

PART 1: COURSES FOR PUBLIC HEALTH SPECIALTY TRAINING PROGRAMME

Part 1: Modules for Public Health Specialty Training Programme

The modular courses will be offered in a didactic manner. The candidate, in order to be eligible to take the part 1 examination, should have taken ALL the courses in over a period of not more than thirty six (36) months. The courses for Part 1 are listed in the next section.

PRINCIPLES OF PUBLIC HEALTH

Course Description

The first part of the course is the introduction to epidemiology. Epidemiology is one of the major basic sciences and the most essential element of public health. Epidemiologists study the distribution of diseases in the population, the causes of the diseases, and work on developing methods for disease control and prevention. In this course students will learn the basic epidemiologic concepts, study designs, biases, confounders and interactions in interpretation of epidemiologic data.

The second part of the course will cover data analysis and interpretation of epidemiological data. The ability to arrive to right decisions is dependent, among other things, on the ability of the decision-maker to correctly interpret the flow of information from different sources. Two skills are crucial for this task: assessment of credibility of the information and the capability to gain the maximum benefit from the information received. During the course, the students will learn and exercise the basic concepts of data Interpretation in order to improve their ability of working with data from different sources relevant to the field of Epidemiology and Public Health.

General Objective

On completion of the first part of the course, students should be able to design and conduct epidemiologic research; analyse and interpret data from epidemiologic research; and upon successful completion of the second part of the course, students should be able to interpret epidemiological data.

Specific Objectives

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

1. Define health indicators
2. Demonstrate understanding of basic epidemiologic concepts
3. Apply measures of association to study designs
4. Appraise problems associated with bias, confounders and interaction in interpretation of epidemiologic data

5. Differentiate different study designs
6. Identify an appropriate study design for meeting an objective
7. Critique a scientific paper.

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

1. Define measures of disease frequency
2. Appraise screening and diagnostic tests
3. To interpret measures of association

Part 1 Course Content

Topic	Description
1	Epidemiology: overview and history
2	Basic concepts in epidemiology, health indicators, disease and mortality
3	Cross-sectional studies, surveys, ecological studies
4	Cohort studies
5	Case-Control studies
6	Measures of association between risk factors and diseases
7	Validity, reliability and accuracy of testing Using screening tests Principles of morbidity prevention in the target population
8	Confounders and interaction
9	Principles of causality approach
10	Clinical trial
11	Community trials
12	Biases and limitations in study
13	Basic concepts in epidemiology of infectious diseases
14	Critical reading of a scientific article
15	Role of epidemiology in public health and health policy

Part 2 Course Content

Topic	Description
1	Introduction to Interpretation of epidemiological data and course overview
2	Facts, explanations and definitions
3	Rates and associations
4	Associations (continued), modifying and confounding effects, refinement
5	The use of rates, causal explanations, testing causal explanations, uses of epidemiological data
6	Group exercise – associations, confounders and modifying effects
7	Prevalence rates, sources of bias in estimating prevalence rates, Use of prevalence data
8	Causality - individual student assignment: Assignment goals and requirements
9	Incidence rates and bias in incidence studies, odds ratios
10	Estimating the individual's chances, standardization
11	Students presentations – exercise on causality

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Computer laboratory
- Self-directed learning

Contact Hours

- Total of 56 hours

Assessment Methods

- Final examination: 50%

Prescribed Books

- Gordis L. Epidemiology. 4th edition. Elsevier Saunders, 2008
- Abramson JH, Abramson ZH. Making sense of data: a self-instruction manual on the interpretation of epidemiological data. 3rd edition. Oxford University Press, 2001.

Recommended Books

- Beaglehole R, Bonita R, Kjellstrom T. Basic epidemiology. WHO, 2002.
- Rothman KJ. Epidemiology: An introduction. 2nd edition. Oxford University Press, 2012.

BIOSTATISTICS 1

There are two biostatistics courses which the candidates is expected to take. Each will be assessed separately, and passing Biostatistics 1 is a prerequisite for Biostatistics 2**.**

Course Description

Introduction to Biostatistics provides an introduction to selected important topics in concepts in Biostatistics and reasoning. This course represents an introduction to the field. Specific topics include tools for describing central tendency and variability in data; methods for performing inference on population means and proportions; statistical hypothesis testing and its application to group comparisons via both parametric and nonparametric tests; issues of power and sample size in study designs; correlations and regressions; use of SPSS statistical software package.

General Objective

At the end of the course, students should be able to interpret and understand appropriate methods of data analysis in medical Biostatistics.

Specific Objectives

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

1. Choose measures of central tendency and spread to appropriately describe a distribution 2. Apply correct method of data analysis to a given objective
3. Interpret results of data analysis.

Course Content

Topic	Description
1	Course introduction and overview Descriptive statistics overview: central tendency measures and measures of
	dispersion, graphical displays/looking at data.
2	Fundamentals of probability, random variables and probability distributions, binomial distribution, sensitivity and specificity, linear transformation of the variables.
3	Normal distribution and central limit theorem

4	Statistic inference and Hypothesis testing: Statistic inference when if the population standard deviation is known (Significance Testing and Confidence Intervals), α, β & Power.
5	Statistic inference when if the population standard deviation is unknown (Significance Testing and Confidence Intervals)
6	Statistical inference for paired samples: Parametric test: Paired t test Non parametric tests: Paired-Sample Sign Test and Wilcoxon Signed Rank Test
7	Statistical inference for two independent samples: Parametric test: Independent samples t test Non parametric tests: Mann–Whitney
8	Multi-sample inference: Analysis of Variance and Kruskal-Wallis Test.
9	Two way ANOVA and interactions.
10	Inferences for proportions and comparing proportions.
11	Relative risk (RR) and Odds ratio (OR) Categorical data analysis, analysis of 2-way tables, goodness of χ^2 fit (test)
12	Pearson and Spearman correlations, Simple linear regression, explained and unexplained variance, testing hypothesis concerning regression coefficients .
13	Multiple linear regression
14	Review for the final exam

The SPSS exercises conducted once every two weeks are aimed at providing the students with basic knowledge for conducting statistical analyses with the SPSS software package. Main topics covered in these exercises will be:

1. Data file structure, commands, frequencies, graphs, central tendencies, dispersion, missing values.
2. Command "select if" for selecting cases. Computations for transformations.
3. Crosstab table. Hypothesis testing, the notion of significance.
4. Relation between two nominal variables - chi-square test.
5. Relation between two scale variables
6. Correlations
7. Linear regression.

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Computer laboratory
- Self-directed learning

Contact Hours

- Total of 56 hours

Assessment Method

- Final examination 100%

Prescribed Books

- Pagano M, Gauvreau K. Principles of biostatistics. 2nd edition. Brooks/Cole, 2002.
- Kleinbaum DG, Kupper LL, Muller KE, Nizam A. Applied regression analysis and nultivariate methods. 3rd edition. Duxbury Press, 1997.

Recommended Books

- Kirwood BR, Sterne JAC. Essential medical statistics. 2nd edition. Blackwell Science Ltd, 2003.

BIOSTATISTICS 2

Course Description

This course builds upon the material learned in Introduction to Biostatistics (Biostatistics A) course. Specifically, the course will focus on multivariate methods of analysis for epidemiologic and clinical studies including partial correlation, multiple linear regression, multiple logistic regression, and Cox proportional hazards regression models. The course will also cover the use of SPSS statistical software package to conduct these analyses.

General Objective

At the end of the course, students should be able to interpret and understand appropriate methods of data analysis in medical Biostatistics.

Specific Objectives

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

1. Determine sample size for a given study design
2. Apply correct method of data analysis to a given objective
3. Interpret results of data analysis

Course Content

A. Topics for class lectures:

1. Introduction and overview of courses covered in the Introduction to Medical Biostatistics (Biostatistics A).
2. Sample size determination for estimating and comparing means and proportions.
3. Partial correlation coefficient.
4. Multiple linear regressions.
5. Multiple logistic regression models.
6. Survival tables and Kaplan-Meier curve.
7. Cox Proportional hazards models.

B. Topics for SPSS exercises:

1. Overview of univariate analysis: Chi-square test, independent samples t - test, paired t - test, ANOVA. Overview of non-parametric tests: Kruskal-Wallis test, Mann-Whitney test and Wilcoxon signed-rank test.
2. Partial correlation.
3. Multiple linear regression models.
4. Multiple logistic regression model.
5. Hazard function and Kaplan-Meier curve of survival. Saving probabilities for survival in the data file. Log-rank test.
6. Cox Proportional hazards model. Drawing survival and hazard curves. Comparing survival curves.

Teaching and Learning Methods

- Lectures and Tutorials
- Small group discussions
- Computer laboratory
- Self-directed learning

Contact Hours

- Total of 42 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- Introduction to Biostatistics (Biostatistics A)

Prescribed Books

- Pagano M, Gauvreau K. Principles of biostatistics. 2nd edition. Brooks/Cole, 2002.

- Kleinbaum DG, Kupper LL, Muller KE, Nizam A. Applied regression analysis and multivariate methods. 3rd edition. Duxbury Press, 1997.

Recommended Books

- Kirwood BR, Sterne JAC. Essential medical statistics. 2nd edition. Blackwell Science Ltd, 2003
- Clayton D, Hills M, Pickles A. Statistical models in epidemiology. Oxford: Oxford university press; 1993.
- Garson GD. Life Tables and Kaplan-Meier analysis: Nonparametric survival analysis. 2012 Edition. Statistical Associates Publishers, 2013.
- Garson GD. Partial correlation. 2012 Edition. Statistical Associates Publishers, 2014.
- Rawlings JO, Pentula SG, Dickey DA. Applied regression analysis: a research tool. 2nd edition. Springer-Verlag New York, Inc., 1998.

EPIDEMIOLOGY

Course Description

This course is divided into two parts: Epidemiology of infectious diseases and Vaccinology. The first part of the course is designed to provide an introduction to the principles and practices of infectious disease epidemiology. It will focus on the aetiology, distribution and determinants of infectious diseases of major public health importance and describe prevention and public health control efforts undertaken locally, nationally and internationally. The course will also provide an insight into emerging infectious diseases and principles of infectious disease surveillance and eradication.

The second part of the course will cover vaccinology. Vaccine safety is of great public importance. Knowledge of vaccine development and immune monitoring is important in building public confidence in vaccinations. The course will also cover evaluation of immunization programs and compliance to vaccination.

General Objective

Upon successful completion of the first part of the course, students should be able to discuss communicable diseases and apply appropriate control methods to contain them. Upon successful completion of this course, students should be able to:

- Discuss communicable diseases and design appropriate control methods to contain them
- Demonstrate the knowledge and skills necessary to provide safe and effective immunization programs.

Specific Objectives

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

1. Identify epidemiological methods in the analysis of a communicable disease
2. Examine the principles of control methods and know how to apply them
3. Design control programs and monitor their progress
4. Identify main epidemiologic characteristics of the major infectious diseases of humans

5. Use epidemiological methods to study infectious diseases
6. Utilize epidemiologic characteristics of infectious diseases to prevent and control their spread
7. Discuss causes and distribution of current epidemics including newly emerging and re-emerging infectious diseases
8. Describe the historical impact of immunization on the epidemiology of vaccine preventable disease.
9. Integrate into practice knowledge about the main steps in vaccine development and evaluation.
10. Demonstrate an understanding of immunization schedules.

Part 1 Course Content

Topic	Description
	Part 1. Epidemiology of Infectious Diseases
1	Introduction: global burden of infectious diseases (ID), recap of basics in ID epidemiology, Transmission of ID, ID trends
2	Principles of infection disease; Prevention and Control Strategies
3	Surveillance of infectious diseases: passive, sentinel, active, syndromic, serosurveillance etc.
4	Epidemiological Investigation of Outbreaks
5	Epidemic investigation
6	Epidemiology and clinical aspects of enteric infections; pathogenesis, prevention and control.
7	Mobility and tourism as risk factors for spread of infectious diseases; travellers' diseases
8	International travel regulations and local health regulations
9	Epidemiology of Sexually Transmitted Diseases (STDs),Malaria and AIDS
10	Epidemiology of zoonotic diseases
11	Epidemiology of hospital acquired (nosocomial) infections
12	Efforts for eradication of infectious diseases - Case Study: Polio
13	Epidemiology of respiratory infections - case study: influenza and TB
14	Students' Presentations on additional selected groups of ID

	Part 2 Vaccinology
1	Vaccine and vaccination in historical perspective
2	Characteristics of the current licensed vaccines (live-attenuated, killed whole cell and subunit, recombinant); Target populations for vaccination.
3	Old and novel strategies for delivering vaccines;
4	Adjuvants: current and future directions
5	The way to licensure; Pre-clinical and clinical development (phases 1,2,3 and 4)
6	Clinical development (cont.)
7	Immune response to vaccines and identification of correlates of protection
8	New approaches in vaccine development; Antigen discovery: reverse vaccinology genomics, proteomics and glycomics
9	Immunization in developed and developing countries. Expanded Program of Immunization; Criteria for vaccine development and vaccination policy
10	Evaluation of immunization programs; Immuno-monitoring, EPI monitoring and indications
11	Compliance to vaccination: The tension between public interest and personal interest in a modern sceptical society
12	Students' Presentations of articles exemplifying vaccine development and vaccination policy issues

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Self-directed learning

Contact Hours

- Total of 56 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- Introduction to Epidemiology

Prescribed Books

Heymann DL (ed). Control of communicable diseases manual. 19th edition. American Public Health Association, 2008.

Levine MM, Levine MM, Dougan G, Good MF, Liu MA, Nabel GJ, Nataro JP (eds). New generationvaccines. 4th edition. CRC Press, 2009.

Recommended Books

Evans AS, Kaslow RA (eds). Viral infections of humans, epidemiology and control. 4th edition. Springer,1997

Evans A, Brachman PS (eds). Bacterial. infections of humans: epidemiology and control. 3rd edition.Plenum Publishing, 1998.

Pickering LK, Baker CJ, Kimberlin DW, Long SS (eds). Red Book: 2009 Report of theCommittee on Infectious Diseases. 28th edition. American Academy of Pediatrics, 2009

Plotkin SA, Orenstein WA, Offit P (eds). Vaccines. 6th edition. W.B. Saunders Company, 2013.

RESEARCH METHODS

Course Description

The course is designed to apply the principles and methods learned in introductory epidemiology and biostatistics courses to the design of epidemiologic studies. The design will culminate in a research proposal.

General Objective

At the end of the course, students should be able to recognize the essential connections between the planning of studies, as well as the collection, analysis, and interpretation of the data, and their application to public health.

Specific Objectives

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

1. Formulate a research problem, title and objectives
2. Identify appropriate study designs to meet objectives
3. Identify appropriate methods of data collection and analysis for study designs
4. Demonstrate proficiency in reading and critically evaluating epidemiologic literature from a methodological perspective.

Course Content

Topic	Description
1	Introduction and course overview
2	Identification of the research problem
3	Formulation of the title and Introduction/Background
4	Review of literature: aim for reviewing literature; how to search for literature; and how to reference
5	Statement of the problem and formulation of the hypotheses
6	Objectives: general and specific

7	Research tools. Validity and reliability
8	Methodology: study design and site; sample size and sampling
9	Data collection methods: qualitative and quantitative
10	Data management and analysis; qualitative and quantitative data
11	Ethical consideration
12	Timelines and budget
15	Course summary

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Self-directed learning

Contact Hours

- Total of 42 hours

Assessment Method

- Final examination: 100%

Prescribed Books

- Neutens JJ, Rubinson L. Research techniques for the health sciences. 3rd edition. Pearson Education Canada, 2001

Recommended Books

- Abramson JH. Research methods in community medicine: surveys, epidemiological research, Programme evaluation, clinical trials. 6th edition. Wiley, 2008.

- Rice PL, Ezzy D. Qualitative research methods: a health focus. Oxford University Press, 2000.

PUBLIC HEALTH ECONOMICS AND MANAGEMENT

Course Description

In this introductory course, students will be given the opportunity to learn how to use economic principles to make sense of health issues. The course will also provide participants with the knowledge and skills needed to be effective managers in the healthcare sector. The delivery of successful health care services relies on effective management and strong leadership.

General Objective

Upon successful completion of this course, students should be able to appreciate economic approaches used in public health and the scope and contribution of health economics; and students should be able to develop management knowledge, which are necessary for effective management of organizations and enterprises in health care sector.

Specific Objectives

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

1. Describe economic techniques that are commonly used in public health
2. Discuss features of demand and supply for health care
3. Explain economic methods used to in public health
4. Demonstrate management skills of analyses, critical thinking, communication and teamwork
5. Differentiate between the role and functions of management and leadership in the management and planning of public health systems
6. Understand the strategic planning process and some of the differences between regular (or operational) and strategic planning.

Course Content

Topic	Description
1	Introduction and course overview Concept of scarcity, production and consumption possibility frontiers Economic growth and economic efficiency.
2	Production function, law of decreasing marginal product, product market equilibrium
3	Cost and supply curves assuming perfect competition
4	Demand curves and elasticity
5	Market equilibrium in perfect competition
6	Government intervention in the economy
7	Healthcare market characteristics
8	Market failures in healthcare and strategies to overcome them
9	Public health expenditure
10	Principles and delivery of health management
11	Types and styles of leadership
12	Needs assessment and evaluation
13	Strategic planning process

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Self-directed learning

Contact Hours

- Total of 28 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- None

Prescribed Books

- Phelps CE. Health economics. 4th edition. Prentice Hall, 2009.
- Buchbinder SB, Shanks NH. Introduction to health care management. 2nd edition. Jones & Bartlett Learning, 2011.

Recommended Books

Guinness L, Wiseman V (eds). Introduction to health economics (understanding public health), 2nd edition. Open University Press, 2011.

Rice T. The economics of health reconsidered. Health Administration Press, 1998.

Drummond MF, Sculpher MJ, Torrance GW, O'Brien BJ, Stoddart GL. Methods for the economic evaluation of health care programmes. 3rd edition. Oxford University Press, 2005.

Burns L, Bradley E, Weiner B. Shortell and Kaluzny's healthcare management: organization design and behavior. 6th edition. Delmar Cengage Learning, 2011.

SCIENTIFIC WRITING

Course Description

The course is designed to introduce students to basic scientific writing. Students will review the general principles of clear, persuasive writing, and will apply these principles to writing for a scientific audience. Particular emphasis will be placed on conveying the significance of research, outlining the aims, and discussing the results for scientific papers. Active and open interaction among students will be encouraged. Ideal endpoints include improved self-editing and development of effective strategies for offering and receiving concise editorial recommendations among peers. This is a mandatory course despite being a non-examinable course.

General Objective

At the end of the course, students should be able to apply general principles of clear and persuasive writing to writing for a scientific paper

Specific Objectives

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

11. Develop, organize and link ideas into clear, persuasive and logical writing
12. Apply general principles of good scientific writing
13. Construct well-organized sentences, paragraphs and documents

Course Content

Topic	Description
1	Introduction to the course
2	General principles of good scientific writing
3	Aspects of grammar
4	Obstacles to readability
5	Punctuation
6	Critic of student writing
7	Ethics of scientific writing

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Self-directed learning

Contact Hours

- Total of 16 hours

Assessment Methods

- Post course quiz: 100%

Prescribed Books

- Madsen D. Successful dissertations and theses: A guide to graduate student research from proposal to completion 2nd edition. Jossey-Bass Publishers, 1921.

Recommended Books

- Matthews JR, Matthews JR. Successful scientific writing: a step-by-step guide for the biological and medical sciences. 3rd edition. Cambridge University Press, 2007.
- Day RA, Gastel B. How to write & publish a scientific paper. 6th edition. Cambridge University Press, 2006.

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Course Description

The course introduces students to physical, chemical and biological hazards found in the environment and health risks associated with workplace and community exposure to them.

General Objective

Upon successful completion of this course, students should be able to identify and mitigate environmental risk factors (both in the general and workplace environment).

Specific Objectives

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

1. Recognize and measure potential environmental and occupational risks from environmental hazards
2. Discuss the relationships between human health and the general and work environment

Course Content

Topic	Description
1	Introduction to environmental health
2	Environmental and Occupational health: exposures, toxicology and law
3	Environmental and occupational cancer
4	Environmental and occupational cases
5	Pressure at work and coping mechanisms
6	Ergonomics
7	Introduction to environmental and occupational hygiene
8	Chemical and biological exposures: recognition and measurement
9	Immunological basis for environmental and occupational diseases
10	Introduction to environmental and occupational epidemiology

Teaching and Learning Methods

- Lectures
- Tutorials
- Small group discussions
- Computer laboratory
- Self-directed learning

Contact Hours

- Total of 28 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- None

Prescribed Books

- Friss RL. Essentials of environmental health. 2nd edition. Jones and Bartlett Learning, 2012.
- Levy BS, Wegman DH, Baron SL, Sokas RK. Occupational and environmental health: recognizing and preventing disease and injury. 6th edition. Oxford University Press, 2011

Recommended Books

- LaDou J. Current occupational & environmental medicine. 4th edition. McGraw-Hill Medical, 2006.
- Konz S, Johnson S. Work design: occupational ergonomics. 7th edition. Holcomb Hathaway, 2007.

PRIMARY HEALTH CARE AND HEALTH SERVICES IN ZAMBIA

Course Description

This course will examine the Zambia Health system and its components and the coordination between PHC and other levels of the health system. The course will provide an insight into the world of health systems and health insurances, highlighting health economy, pricing and budget principles and will present the students with risk management dilemmas and the professional ethics involved in healthcare. The course is designed to expose the student to the complexity of the health systems and to provide basic knowledge on the Zambia health system.

General Objective

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

1. Describe the Zambia Health system and its components and the coordination between PHC and other levels of the health system
2. Utilize knowledge, skills, and beliefs related to management in the running of hospitals

Specific Objectives

By the end of this course, students will be able to:

1. Explain the objectives, functions and organization of primary health care services
2. Examine primary health services according to their objectives, functions and organization
3. Appraise the extent to which care is integrated and coordinated between providers involved in the various levels of health care
4. Demonstrate awareness of services available at and provided by Health Services at different levels
5. Develop program plans
6. Manage people

Course Content

Topic	Description
1	Course introduction and overview
2	Levels of health care in Zambia
3	What is Primary Health Care (PHC)?
4	Coordination between PHC and other levels of health care
5	Psychiatric hospitalization in light of the reform in the mental health system
6	Information system in hospitals
7	Managing the human resources in hospitals
8	New approaches in management
9	Management of the control system in hospitals
10	Patient safety and risk management – system aspects
11	Equity and effectiveness in PHC
12	Features of PHC (First contact, person focussed over time, comprehensiveness and coordination)
13	Core tasks of public health and its strategies
14	Quality of PHC
15	PHC assessment tools

Contact Hours

- Total of 28 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- None

Prescribed Books

- Greenhalgh T. Primary health care: theory and practice. Blackwell Publishing BMJ Books, 2007.
- Williams SJ, Torrens PR. Introduction to health services, 7th edition. Delmar Cengage Learning, 2007.

Recommended Books

- Booyens SW. Introduction to health services management. Juta and Company Ltd, 2008.
- Thomas RK. Health services planning. 2nd edition. Springer US, 2003.

MEDICAL RESEARCH ETHICS

Course Description

This course introduces the norms guiding medical research. It discusses importance of maintaining ethical standards and "standard of care", respect for human rights, justice, exploitation and how to provide safeguards for patients and informants.

General objective

Upon successful completion of this course, students should be able to apply principles of scientific research ethics in the conduct of studies

Specific objectives

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

1. Define research ethics
2. Understand the central events of the development of health research ethics that influenced the ethical standards to protect research participants
3. Know the main international guidelines
4. Know the ethical principles and be able to interpret and use them in research practice
5. Know what is needed to gain approval from an ethical review board
6. Assess truth, lies and deception in scientific research
7. Appraise ethical issues in scientific reports and other publications
8. Exhibit respectful behavior toward other people, animals, and the natural environment

Course Content

Lecture	Topics
1	Introduction, overview, and research misconduct, what is research ethics
2	Development of health research ethics that influenced the ethical standards to protect research participants
3	International guidelines
4	Ethical principles
5	Ethical issues involving vulnerable group
6	Truth, lies and deception in scientific research
7	Scientific reports and publications
8	Ethical guidelines and regulations in biomedical research, conflict of interests
9	Appraise ethical issues

Teaching and learning methods

- Lectures
- Tutorials
- Small group discussions
- Self-directed learning

Contact Hours

- Total of 14 hours

Assessment Methods

- Final examination: 100%

Course Prerequisites

- None

Prescribed Books

- Daly J. Ethical intersections: health research, methods, and researcher responsibility. Westview Press, 1996.

Recommended Books

- Sugarman J, Sulmasy DP. Methods in medical ethics. Georgetown University Press, 2001.
- Boomgaarden J, Louhiala P, Wiesing U. Issues in medical research ethics. Berghahn Books, 2003

INDICATIVE RESOURCES

Abramson JH, Abramson ZH. Making sense of data: a self-instruction manual on the interpretation of epidemiological data. 3rd edition. Oxford University Press, 2001.

Beaglehole R, Bonita R, Kjellstrom T. Basic epidemiology. WHO, 2002.

Boomgaarden J, Louhiala P, Wiesing U. Issues in medical research ethics. Berghahn Books, 2003

Booyens SW. Introduction to health services management. Juta and Company Ltd, 2008.

Buchbinder SB, Shanks NH. Introduction to health care management. 2nd edition. Jones & Bartlett Learning, 2011.

Burns L, Bradley E, Weiner B. Shortell and Kaluzny's healthcare management: organization design and behavior. 6th edition. Delmar Cengage Learning, 2011.

Clayton D, Hills M, Pickles A. Statistical models in epidemiology. Oxford: Oxford university press; 1993.

Daly J. Ethical intersections: health research, methods, and researcher responsibility. Westview Press, 1996.

Day RA, Gastel B. How to write & publish a scientific paper. 6th edition. Cambridge University Press, 2006.

Drummond MF, Sculpher MJ, Torrance GW, O'Brien BJ, Stoddart GL. Methods for the economic evaluation of health care programmes. 3rd edition. Oxford University Press, 2005.

Garson GD. Life Tables and Kaplan-Meier analysis: Nonparametric survival analysis. 2012 Edition. Statistical Associates Publishers, 2013.

Garson GD. Partial correlation. 2012 Edition. Statistical Associates Publishers, 2014.

Gordis L. Epidemiology. 4th edition. Elsevier Saunders, 2008

Greenhalgh T. Primary health care: theory and practice. Blackwell Publishing BMJ Books, 2007.

Guinness L, Wiseman V (eds). Introduction to health economics (understanding public health), 2nd edition. Open University Press, 2011.

Kirwood BR, Sterne JAC. Essential medical statistics. 2nd edition. Blackwell Science Ltd, 2003.

Kirwood BR, Sterne JAC. Essential medical statistics. 2nd edition. Blackwell Science Ltd, 2003 Kleinbaum DG, Kupper LL, Muller KE, Nizam A. Applied regression analysis and nultivariate methods. 3rd edition. Duxbury Press, 1997.

Kleinbaum DG, Kupper LL, Muller KE, Nizam A. Applied regression analysis and multivariate methods. 3rd edition. Duxbury Press, 1997.

Madsen D. Successful dissertations and theses: A guide to graduate student research from proposal to completion 2nd edition. Jossey-Bass Publishers, 1921.

Matthews JR, Matthews JR. Successful scientific writing: a step-by-step guide for the biological and medical sciences. 3rd edition. Cambridge University Press, 2007.

Matthews JR, Matthews JR. Successful scientific writing: a step-by-step guide for the biological and medical sciences. 3rd edition. Cambridge University Press, 2007.

Pagano M, Gauvreau K. Principles of biostatistics. 2nd edition. Brooks/Cole, 2002.

Pagano M, Gauvreau K. Principles of biostatistics. 2nd edition. Brooks/Cole, 2002.

Phelps CE. Health economics. 4th edition. Prentice Hall, 2009.

Rawlings JO, Pentula SG, Dickey DA. Applied regression analysis: a research tool. 2nd edition. Springer-Verlag New York, Inc., 1998.

Rice T. The economics of health reconsidered. Health Administration Press, 1998.

Rothman KJ. Epidemiology: An introduction. 2nd edition. Oxford University Press, 2012.

Sugarman J, Sulmasy DP. Methods in medical ethics. Georgetown University Press, 2001. Williams SJ, Torrens PR. Introduction to health services, 7th edition. Delmar Cengage Learning, 2007.