



THE INTER-UNIVERSITY
COUNCIL FOR EAST AFRICA

BENCHMARKS FOR THE MASTER IN ONE HEALTH

JUNE 2024





THE INTER-UNIVERSITY
COUNCIL FOR EAST AFRICA

BENCHMARKS FOR THE MASTER IN ONE HEALTH

JUNE 2024



©The Inter-University Council for East Africa and International Livestock Research Institute
This publication is licensed for use under the Creative Commons Attribution 4.0 International
Licence. To view this licence, visit: <https://creativecommons.org/licenses/by/4.0/>.”

Citation:

Inter-University Council for East Africa and International Livestock Research Institute, 2024.
Benchmarks for Master in One Health.

Kampala, Uganda: IUCEA and Nairobi, Kenya: ILRI

CONTENTS

List of Figures	iii
List of Tables	iv
Acronyms	v
Acknowledgements	vi
Forward	viii
Preamble	x
Introduction	1
Background	1
1.2 Objectives of the Benchmarks	3
1.3 Justification	4
1.4 Eligibility for Admission	5
1.5 The Benchmarks Development Process	5
1.6 Stakeholder's Engagement	6
Use of Benchmarks	7
Benchmarks and Qualification Standards for a Master's degree programme in one health	7
2.2 The Benchmarks and Curriculum design	8
2.2.1 Programme Objectives	8
2.2.2 Formulating expected Learning outcomes	9
2.2.3 Translating Learning outcomes into the programme	14
2.2.4 Course description	14
2.3 The Benchmarks and Quality Assurance	14
2.4 Implementation of Benchmarks	15
2.5 Review of the Benchmarks	15
Benchmarks for the master's degree programme in one health	16
3.1 Description of One Health	16
3.2 One Health programme Goal	17
3.3 Programme Objectives	17

3.3.1	Academic ability	17
3.3.2	Employability	17
3.3.3	Personal development	18
3.4	Expected Learning Outcomes (ELO's)	18
3.5	Translating the Learning Outcomes into the Basic Phase of the Master's Degree programme in One Health	19
3.6	Expected Competencies	20
3.7	List of Courses in One Health Programme	21
3.8	Learning Outcomes and Curriculum Alignment Matrix	21
3.9.1	Core-subject courses	24
3.9.1.1	Fundamentals and principles of public health and policy	24
3.9.2	Supportive-subject courses	27
3.9.2.1	Socio-anthropology	27
3.9.2.2	Zoonoses, emerging & re-emerging infectious diseases	27
3.9.2.3	Basic principles of Epidemiology	27
3.9.2.4	Climate change	27
3.9.2.5	Monitoring and evaluation in One Health	27
3.9.2.6	Health promotion in One Health	28

LIST OF FIGURES

Figure 1: Revised Bloom Taxonomy (Biggs 2021)	14
Figure 2: Formulating Expected Learning Outcomes and Actions	12
Figure 3: Categorization of Learning Outcomes	13

LIST OF TABLES

Table 1: Curriculum Alignment Matrix	14
Table 2: Expected Learning Outcomes for the Master in One Health	18
Table 3: List of Core Subject Areas and Supporting Areas for the Master in One Health	21
Table 4: Expected Learning Outcomes and Course Alignment Matrix (For explanation of the numbers see Table 2)	22

ACRONYMS

AFROHUN	Africa One Health University Network
AMP	Assessment Mitigation Performance
AMR	Antimicrobial Resistance
CDC	Center for Disease Control
CGIAR	Consortium of International Agricultural Centers
COHESA	Capacitating One Health in Eastern and Southern Africa
CPD	Continuing Professional Development
DAAD	German Academic Exchange Service
DIES	Dialogue on Innovative Higher Education Strategies
EAC	East African Community
EAC-TWG	East African Community Technical Working Group
EAQFHE	East African Qualifications Framework for Higher Education
ELO's	Expected Learning Outcomes
EPT's	Emergence of Pandemic Threats
EQF	European Qualification Framework
FAO	Food and Agricultural Organization
HEIs	Higher Education Institutions
HRK	Germany Rectors' Conference
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
ILRI	International Livestock Research Institute
IUCEA	Inter-University Council for East Africa
IUFoST	International Union of Food Science and Technology
J-TWC	Joint Technical Working Committee
NQF	National Qualifications Framework
OH	One Health
OHHLEP	One Health High-Level Expert Panel
OH JPA	One Health Joint Plan of Action (2022–2026)
OHRECA	One Health Research, Education and Outreach Centre in Africa
QA	Quality Assurance
SARS	Severe Acute Respiratory Syndrome
SARUA	Southern African Region Universities Association
TWG	Technical Working Group
WHO	World Health Organization

ACKNOWLEDGEMENT

I wish to extend my sincere appreciation to individuals representing various higher education institutions, stakeholders, and partners for their invaluable contributions in the development of the benchmarks for the Master's degree in One Health programme in particular.

I express my gratitude to Prof. Delia Grace Randolph of the International Livestock Research Institute (ILRI) and University of Greenwich, UK; Dr. Hung Nguyen-Viet of ILRI and Dr. Theo Knight-Jones from ILRI -COHESA, for providing technical facilitation and steering Technical Working Group virtual meetings and physical workshops to develop the benchmarks. I am equally grateful to the technical team for developing and finalizing this document. These included Dr. Kuorwel Kuai of the University of Juba, South Sudan; Prof. Martin Ntawubizi of the University of Rwanda, Dr. Juliet Kiguli of Makerere University; Dr. Clovice Kankya of Makerere University; Prof. Gabriel Shirima of the Nelson Mandela African Institute of Science and Technology; Dr. Abuom Tequero of the University of Nairobi; Dr. Habonayo Richard of the University of Burundi; Dr. Ntirandekura Jean Bosco of the University of Burundi; Dr. Samuel Nyamweya of Egerton University; Prof. Dr. Bitwe Mihanda Richard of the University of Goma; Prof. Theoneste Ntakirutimana of the University of Rwanda; Prof. Charles Kahindo of the Public University of Bukavu; Dr. Milton Melingasuk Lado of the University of Juba; Dr. Abubakar Hoza of Sokoine University of Agriculture; Dr. Clément Kandu Lelo of the University of Kinshasa; Dr. Florence Mutua and Dr. Shauna Richards both of ILRI.

I also wish to acknowledge Capacitating One Health in Eastern and Southern Africa (COHESA) and the One Health Initiative at CGIAR for financial support to the development of these benchmarks. COHESA is co-funded by the OACPS Research and Innovation Programme, a programme implemented by the Organization of African, Caribbean and Pacific states (OACPS) with the financial support of the European Union. The contribution of the One Health Outreach Centre in Africa (OHRECA) under ILRI, is also highly appreciated.

I am equally grateful to the technical contributions of Dr. Nomazile Chicho of the Southern African Region Universities Association (SARUA); Prof. Musso Munyeme of the University of Zambia; Dr. Hassim Ayesha of the University of Pretoria; Prof. Mirgissa Kaba of Addis Ababa University; and Ms. Agnes Ayawe of the AFROHUN Regional Office, Kampala, who participated as observers and contributed to the dynamic discussions and offered their expertise in the benchmark development.

Similarly, I wish to extend my sincere appreciation to Prof. Michael Mawa (Senior Principal Quality Assurance and Qualifications Framework Officer), Prof. Alexis Ndabarushimana (Senior Quality Assurance and Standards Officer), and Dr. Robert Ayine (Senior Qualifications Framework Officer) of IUCEA, for their invaluable contribution and support to this process.



Prof. Gaspard Banyankimbona
Executive Secretary

FOREWORD

The Inter-University Council for East Africa (IUCEA) is a strategic institution of the East African Community (EAC), responsible for the development and coordination of higher education and research in the region. The EAC considers higher education as critical for the attainment of socio-economic development and regional integration. As such, after having been recognized as the surviving institution of the former Community, responsible for coordinating the networking of universities in the region, IUCEA assumed a broader role as a building block for the achievement of sustainable socio-economic development and regional integration. In that regard, the mission of IUCEA now focuses on the promotion of strategic and sustainable development of higher education systems and research for supporting East Africa's socio-economic development and regional integration. The IUCEA has set its vision to become the leading EAC institution for an exemplary Common Higher Education Area for a prosperous and sustainable East African Community.

Hence, in 2006 IUCEA initiated a process aimed at harmonizing regional quality assurance by establishing a common East African quality assurance framework, and a regional quality assurance office at the IUCEA Secretariat and setting regional higher-education benchmarks and quality standards, based on internationally recognized frameworks. The process is

also intended to produce a user-friendly quality assurance handbook, based on existing national benchmarks and systems, and to streamline national and institutional quality-assurance systems according to local perspectives, with the aim of promoting the international competitiveness of East African universities.

The initiative also focused on capacity building through training the staff of universities and national commissions and councils for higher education in the partner states on the implementation of the quality assurance system. The initiative is also linked to the establishment of a regional qualification's framework. It was anticipated that the regional qualifications framework would facilitate harmonization of education and training systems and qualifications, and clearly indicate the programme learning outcomes, the different qualification levels, credit system and recognition of prior learning, among others.

Therefore, the framework is expected to facilitate mutual recognition of qualifications across the region as envisioned in the EAC Common Market Protocol. All these interventions contributed significantly in transforming the East African Community into a Common Higher Education Area, a declaration that was made by the 18th Summit of the EAC Heads of State on 20th May, 2017.

In developing the regional quality assurance system for higher education in East Africa, IUCEA, in collaboration with the German Academic Exchange Service (DAAD) and the Germany Rectors' Conference (HRK) within the framework of their joint Higher Education Management support programme, referred to as "Dialogue on Innovative Higher Education Strategies (DIES)", started to work on this initiative through a consultative process involving various stakeholders of higher education in the region. The process involved holding several consultative meetings and workshops at country and regional levels, aimed at building consensus and mapping out a strategy for establishing a regional quality assurance framework. This included the development of an operational tool in the form of a Quality Assurance Handbook. The consultative forums were also aimed at ensuring that all performance indicators and quality benchmarks were agreed upon and owned by all end-user institutions.

Additionally, IUCEA intended to develop more subject-specific benchmarks as part of the tools for the harmonization of academic programmes offered in Higher Education Institutions (HEIs) in the region. The first benchmarks developed

were for Bachelor of Business Studies programmes. Subsequently, benchmarks were developed for other programmes, including the Bachelor of Computer Science and Bachelor of Information Technology; Bachelor of Science in Agriculture, Horticulture, Animal Science, Food Science and Technology; Bachelor of Education; Medicine (MD/MBChB), Bachelor of Science in Food Safety, Bachelor of Sports Sciences; and Dentistry (DDS/BDS).

This publication contains benchmarks for Master's degree in One Health programme, developed through a consultative process involving experts from universities, industry, and government agencies, among other partners.

On behalf of the IUCEA secretariat, it is my sincere hope and expectation that the higher education fraternity in the region will make use of these benchmarks to ensure that our programmes are relevant and of the highest quality.



Prof. Gaspard Banyankimbona,
Executive Secretary
Kampala, June 2024

PREAMBLE

Over the years, IUCEA has developed a Regional Quality Assurance System that seeks to harmonize the quality of higher education in East Africa, and the development of benchmarks is an important component of this System. The Regional Quality Assurance System is one of the key pillars in the realization of the East African Common Higher Education Area.

The benchmarks for Master's degree in One Health programme contained herein have been developed as one of the set milestones for the development of programme benchmarks. The main objective of benchmarks in One Health is to provide a baseline for comparability of the Master in One Health programme and its graduates within and outside the East Africa Community, by harmonizing practice in the region. The benchmarks developed are neither prescriptive nor absolute standards; they serve as a yardstick or a point of reference for curriculum developers.

This document has been structured into three (3) parts:

Part 1: presents the background, objectives, and justification of the benchmarks in One Health. It also describes the benchmarks development process.

Part 2: prescribes how the benchmarks should be used, focusing on benchmarks and qualifications, benchmarks and curriculum design, and benchmarks and quality assurance.

Part 3: provides a detailed description of the Master's degree programme in One Health, focusing on the goals, expected learning outcomes, and course content.

PART ONE: INTRODUCTION

1.0 Background

Globally, the One-Health approach is acclaimed as a critical approach to addressing multidimensional health challenges, including: emerging infectious diseases and pandemics like COVID-19; the burden of zoonotic diseases; the upsurge of food, land and water-safety hazards; the impacts of pollution; the growing threat of antimicrobial resistance; and the degradation of natural ecosystems and biodiversity. In response to these multidimensional health challenges, a quadripartite coalition (FAO, UNEP, WHO and WOA) developed a shared vision for the transformations required to prevent and mitigate the impact of current and future health challenges at global, regional and country levels. This shared vision is part of the One Health Joint Plan of Action. It is, therefore, essential to integrate the One-Health approach into relevant development initiatives, such as pandemic prevention, preparedness, and response; improved health systems; animal health and welfare; sustainable food systems; and environmental integrity (UNEP, 2022)

Furthermore, the African Union's Agenda 2063 recognizes the critical need for collaboration in handling issues of human, animal and environmental health. The vision appreciates that by unifying stakeholder efforts, the One-Health approach seeks to create a resilient framework capable of addressing the challenges posed by zoonotic diseases, environmental change, and habitat overlap (AU, 2023). The One-Health approach is critical for accelerating the implementation of the International Health Regulations (IHR 2005) and the OIE standards, to safeguard the socioeconomic and political integration of the continent and achieve the aspiration of AU Agenda 2063: the Africa we Want. Zoonotic diseases decrease food availability, creating local and international trade barriers. The World Bank (2010) estimated the direct cost of zoonotic diseases over the previous decade to have been more than \$ 20 billion, with over \$ 200 billion as direct losses to affected economies. For example, there was a loss of over \$ 3.6 trillion from Covid-19, a \$53 billion loss due to the 2014 -16 Ebola outbreak, a \$ 20 billion loss from Zika, and a \$ 8.6 billion loss due to canine rabies (Africa-Centres for Disease Control & Prevention, 2022).

Economic development has led to substantial improvements in the well-being of many people globally, but often at the expense of ecosystem health. With an increasing global human population, projected to have reached 8 billion by 2023, amid unsustainable consumption and production patterns, the pressures on our natural systems are

likely to be immense (FAO, UNEP, WHO and WOAHA, 2022). Moreover, the pressures to match production to population growth have resulted into the use of chemicals and antimicrobials. While it is generally accepted that chemicals play an important role in agricultural development because they can reduce the losses of agricultural products and improve yields and food quality increased use of large amounts of such chemicals has adverse effects on non-target plants and environmental media, with dire consequences for ecosystems and human health (Tudi et al, 2021).

New paradigms have emerged in the handling of human health, based on understanding of ecosystem health. Zoonotic diseases are becoming increasingly common, arising from increasing infections from humans to animals, and vice versa. Scientists have estimated that more than 60% of known infectious diseases in humans spread from animals, and up to 75% of new or emerging diseases in humans come from animals (Taylor, Latham & Woolhouse, 2001). It, therefore, requires a concerted effort that integrates knowledge on animal-human health and the ecosystem in the design of interventions.

With the emergence of pandemics, such as Ebola, Monkey pox, and Covid-19, sub-optimal detection and response are often not immediate or forthcoming. Sometimes, responses are constrained by lack of a systematic approach to such diseases that in most cases require a multi-sectoral and multidisciplinary approach, involving different professionals and stakeholders. In addition, the inability to promptly detect, report and respond to such epidemics has compromised further the effectiveness of interventions in public health threats. As a result, there is an urgent need to reassess and transform the interactions among humans, animals, plants and the environment they share. Balancing these interactions ensures human, animal and plant health and well-being, and charts the path towards economic, environmental and social sustainability.

The East African Community, just like other regional organizations, is called upon to strategize ahead of time, and lead by building the required capacity for One Health professionals who are expected to fill the existing gap, and bridge the plans and interventions of different health, social and environmental professional tracks. The current development of One Health benchmarks, undertaken by IUCEA aligns with this imperative, and is part of IUCEA's mandate to promote quality education and free movement of skilled One Health professionals across the region and beyond.

Relevant resources:

FAO, UNEP, WHO, and WOAHA. 2022. One Health Joint Plan of Action (2022–2026). Working together for the health of humans, animals, plants and the environment. Rome. <https://doi.org/10.4060/cc228gen>

Taylor, L.H., Latham, S.M. and Woolhouse, M.E.J. 2001. Risk factors for human disease emergence. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences* 356(1411). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1088493/>

Jones, K.E., Patel, N.G., Levy, M.A., Storeygard, A., Balk, D., Gittleman, J.L. and Daszak, P. 2008. Global trends in emerging infectious diseases. *Nature* 451(7181): 990–993. <https://doi.org/10.1038/nature06536>

AU (2023): Charting a Path to Healthier Africa: AU One Health Strategy for zoonotic diseases take shape. Africa Union One Health Data Alliance Africa – Mon 23-10-2023, Inter-African Bureau for Animal Resources www.au.ibar.org

Muyesaier Tudi, Hauda Daniel Ruan, Li Wang, Jia Lyu, Ross Sadler, Des Connel, Cordia Chu, Dung Tr Phung (2021): Agricultural Development, Pesticide Application and its impact on the Environment, *Internal Journal of Environmental Research & Public Health* 2021,18(3), 1112

1.2 Objectives of the Benchmarks

- i. The Master's degree programme in One Health should be designed in such a way that it addresses the concerns of different stakeholders across the region. This can be achieved by focusing on the following broad programme objectives:
- ii. Develop a harmonized One-Health curriculum to promote programme quality and increase access and mobility of students and staff.
- iii. Build effective collaboration and synergy for advocacy and political will, and leverage investment for an evidence-based One-Health approach,
- iv. Improve coordination, communication and alignment of One- Health activities and capacity-building efforts, including in the provision of technical support, normative frameworks, research, education, and guidance,
- v. Strengthen cross-sectoral and cross-border capacity to co-design and implement inclusive and equitable multilevel work plans and strategies in line with One-Health principles.

Relevant resources

- *One Health High-Level Expert Panel (OHHLEP), Adisasmito WB, Almuhairi S, Behravesh CB, Bilivogui P, Bukachi SA, et al. (2022) One Health: A new definition for a sustainable and healthy future. PLoS Pathog 18(6): e1010537. <https://doi.org/10.1371/journal.ppat.1010537>.*
- *FAO, UNEP, WHO, and WOA. 2022. One Health Joint Plan of Action (2022–2026). Working together for the health of humans, animals, plants and the environment. Rome. <https://doi.org/10.4060/cc2289en>*
- *WWW.onehealthinitiative.com*
- *FAO, UNEP, WHO, and WOA. 2022. One Health Joint Plan of Action (2022–2026). Working together for the health of humans, animals, plants and the environment. Rome. <https://doi.org/10.4060/cc2289en>*

1.3 Justification

According to CDC (2021), nearly 75% of all new, emerging and re-emerging diseases, and 60% of the known diseases affecting humans at the beginning of the 21st Century, originate from wildlife. Diseases, such as Monkey pox, Ebola, Acute Respiratory Syndrome (SARS), Avian Influenza and, more recently, COVID-19, also originate from animals. Although such diseases often have to be dealt with using a multifaceted approach, professionals in human health, animal health and agriculture have worked in silos, independent of each other, as they address them. The pandemic nature of these diseases and their diffusion has generated serious public health, socio-economic and development concerns. It is also increasingly evident that the emergence and re-emergence of pandemic threats (EPTs) and other public health threats are complex and multifaceted, as evidenced by the current Covid-19 pandemic. The effectiveness of their management and countering requires multiple lines of collaborative actions and sustained cross-sectorial coordination. Therefore, the new paradigm calls for a concerted effort, focusing on a collaborative, multi-pronged approach in tackling such diseases. However, there exists no clear framework in which such a collaboration can thrive. In addition, there are no readily available structured training programmes of One Health that are deliberately designed to address such concerns. Moreover, higher education institutions do not have tailor-made programmes of training in One Health to build the capacity of cadres, with knowledge, skills and competencies in one health.

It is, therefore, prudent that professionals be equipped with knowledge and skills to be able to mitigate the adverse effects of diseases and environmental degradation on human health. In addition, such professionals, capable of generating holistic evidence, will contribute to programmes and policies for One-Health interventions. To address the current skills and training gap, there is need to develop common benchmarks for the Master's degree programme in One Health across the region, to guide universities in developing and reviewing curricula in One Health. The same benchmarks will also guide the Commissions and Councils for Higher Education in developing minimum standards for One-Health programmes, and in the accreditation of such programmes intended to produce a critical mass of OH professionals that will spearhead the management of emerging and re-emerging public-health threats across the East Africa region and beyond.

Relevant resources

FAO, UNEP, WHO, and WOA. 2022. One Health Joint Plan of Action (2022–2026). Working together for the health of humans, animals, plants and the environment. Rome. <https://doi.org/10.4060/cc228gen>

1.4 Eligibility for Admission

Candidates with a Bachelor's degree in the following, and other related, disciplines:

- i. Health Sciences
- ii. Veterinary Sciences,
- iii. Animal Sciences,
- iv. Biological Sciences
- v. Environmental Sciences
- vi. Arts & Humanities
- vii. Natural Sciences
- viii. Agricultural Sciences
- ix. Social Sciences
- x. Applied Sciences
- xi. Science & Technology
- xii. Engineering Sciences

1.5 The Benchmarks Development Process

The development of the benchmarks for the Master's degree programme in One Health has involved several physical and virtual discussions by different stakeholders.

The partnership between IUCEA and ILRI was guided to contact the Inter-University Council for East Africa (IUCEA) which is mandated to coordinate the development of programme benchmarks for harmonization of curricula in the East African Community. In 2021, ILRI engaged IUCEA to discuss the prospects of the development of benchmarks on One Health, and the two entered a partnership to develop benchmarks in food safety.

In 2022, the process of developing the benchmarks formally started with the establishment of a Technical Working Group, made up of experts in One Health disciplines from the EAC region (EAC-TWG) and a team of observers drawn from Southern and Eastern Africa higher education organizations and universities. These included the University of Juba, University of Rwanda, Makerere University, Nelson Mandela African Institution of Science and Technology, and University of Nairobi. The others were: University of Burundi, Egerton University, University of Goma, Public University of Bukavu, Sokoine University of Agriculture, and University of Kinshasa.

The observers were drawn from the Southern African Region Universities Association (SARUA), African One Health University Network (AFROHUN), University of Zambia, University of Pretoria and Addis Ababa University.

The TWG experts were persons specialized in Veterinary Science, Public Health, Human and Animal Health, Environmental Science, and the social sciences, and they were supported by a technical team from ILRI and IUCEA. The team mobilized resources and offered guidance in the development of the benchmarks.

Physical and virtual meetings were held to agree on the framework of the benchmarks. The framework focused on expected learning outcomes, core and supportive courses (modules), an alignment matrix, and course descriptions.

1.6 Stakeholder's Engagement

The development of the benchmarks of One Health was participatory. Various stakeholders were engaged in the process at different stages before and during the development. The process involved the identification of higher education institutions teaching One Health-related courses or programmes within the region. In all, eleven (11) higher education institutions were identified, and participated in survey which, among other things, sought to establish the competencies expected of professionals in One Health.

The TWG held two physical meetings in the development process. In the first physical meeting, held in March 2023 in Naivasha, Kenya, the experts were introduced to the online version of the competence questionnaire, and they took part in the survey. The meeting included a session where participants reviewed their responses alongside those from the universities. The outcome of the discussion was a proposed list of One Health competencies, which was then shared with more stakeholders at the country level.

The second meeting was held in May 2023 in Arusha, United Republic of Tanzania. During the meeting, an online tool was developed and administered to selected stakeholders. The stakeholders included higher education experts, professional bodies, employers, and industrial professionals, and included experts drawn from the disciplines of Public Health, Human and Animal Health, Environment, and the social sciences. In addition, the TWG consulted relevant departments of Higher Education Institutions (HEIs), National Commissions and Councils responsible for Higher Education, research organizations, government ministries, departments and agencies, and non-governmental organizations (NGOs) from all the EAC partner states.

The responses from all the stakeholders were reviewed and integrated in the development of the benchmarks.

PART TWO: USE OF BENCHMARKS

2.1 Benchmarks and Qualification Standards for a Master's degree programme in One Health

The benchmarks for One Health recognize the existing standards and qualifications frameworks within the respective EAC partner states. Indeed, they are aligned to the East African Qualifications Framework for Higher Education (EAQFHE) and to the various National Qualifications Frameworks (NQF) in the region. Moreover, the benchmarks are not prescriptive; rather they are meant to be a source of reference in the development of programmes in One Health.

The benchmarks recognize the fact that, in recent decades, there has been significant, global efforts in the development of NQFs in various countries. These NQFs may be regarded as the policy framework that defines all qualifications recognized nationally in post-compulsory education and training within a country. The NQFs comprise titles and guidelines which define each qualification, together with the principles and protocols covering articulation and issuance of qualifications, and statements of attainment. The EAC partner states are at different levels of NQF development, with some having developed, and started implementing, NQFs while others are still at the conceptualization level. The East African Qualifications Framework for Higher Education (EAQFHE) formed the basis of the competencies and the descriptors expected at the Master's degree level in One Health. The EAQFHE defines qualifications framework as "an instrument for the development and classification of qualifications according to a set of criteria for levels of learning and skills and competences achieved."¹

A review of the European Qualifications framework, NQFs in Europe and NQFs in other parts of the world, shows concerted efforts to describe the different levels of education. A qualifications framework describes education in a spectrum from basic to higher education. The levels defined in higher education include Higher Education Certificate, Diploma, Bachelor's degree, Master's degree and Doctorate. For purposes of these benchmarks, only the Master's degree level is considered. Regardless of the levels defined in the various NQFs, the descriptors for the Master's degree level are considered in the development of competencies, rigor of training and the expected assessment and qualification. In the EAQFHE, the Master's degree is defined as Level 7

¹UCEA, The East African Qualifications Framework for Higher Education, 2015

According to the EAQFHE, the holder of a Level 7 qualification should be able to demonstrate comprehensive, specialized, factual and theoretical knowledge of the relevant major discipline, analyze new or abstract data and situations, using a range of techniques, and apply skills and demonstrate understanding in a wide and unpredictable variety of contexts, with substantial personal responsibility for the work of others and responsibility for the allocation of resources, policy, planning, execution and evaluation.

2.2 The Benchmarks and Curriculum Design

Benchmarks are an important tool that provides guidance in the development and review of curricula in HEIs. The National Commissions and Councils for Higher Education in the EAC partner states use programme standards and benchmarks in the assessment and accreditation of curricula.

Therefore, benchmarks are required in providing guidance in the harmonization of programmes, in improving the quality of higher education, and in facilitating student mobility.

One of the key facets of benchmarks is their emphasis on learning outcomes because they guarantee:

- i. Comparable quality levels of the postgraduates;
- ii. Comparable chances for the graduates in the labour market;
- iii. Labour-market understanding of the competencies that One-Health postgraduates possess;
- iv. Increased national, regional, and international mobility of students; and
- v. Increased national, regional, and international mobility of staff.

2.2.1 Programme objectives

Given that the benchmarks for the Master's degree programme in One Health were designed to address the concerns of different stakeholders, those concerns should be reflected in the programme objectives. These objectives can be grouped into three categories:

- i. Academic ability
- ii. Employability
- iii. Personal development

A review of existing learning outcomes in One-Health courses in various higher education institutions in the region showed that, generally, universities had not developed any specific programme objectives or learning outcomes aligned to One Health.

One Health in the selected institutions is taught as disaggregated courses and not as a discrete programme. As a result, the learning outcomes and competencies in those courses do not focus solely or mainly on One Health.

2.2.2 Formulating expected learning outcomes

One of the key steps in designing or redesigning programmes is the formulation of the learning outcomes. The purpose of learning outcomes is to state clearly the competences that the student is expected to demonstrate by the end of a programme of study, a module or a course. HEIs are expected to compare and align their formulated learning outcomes with the benchmarks; and each learning outcome should be accompanied with an indication of how it will be measured or assessed. That is why benchmarks are formulated based on learning outcomes.

The European Qualification Framework (EQF) defines expected learning outcomes *as statements of what a learner knows, understands and is able to do on completion of a learning process, which are defined in terms of knowledge, skills and competence*. A competence, according to the EQF, is the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. According to EAQFHE, competences are contextualized learning outcomes and qualifications are sometimes described in terms of learning outcomes. Competences are fundamentally a statement of what a person is able to do after achieving a particular level of learning.

Incorporating competencies in One Health will help improve the quality of education in HEIs by establishing the prerequisite skills and competencies of the postgraduates. In short, while learning outcomes should not be equated to competencies, the two are not mutually exclusive. A graduate exhibiting competency at a workplace will have partly acquired the skills as outcomes of his/her study, or from elsewhere.

It has been observed that although universities are engaged in the practice of defining objectives and measuring outcomes in one form or another, many do not approach the process of formulating learning outcomes in a uniform and collaborative way. It is important to note that focusing on, and defining, learning outcomes creates an opportunity to:

- i. Enhance learners' learning and mobility;
- ii. Provide guidance to course instructors;
- iii. Identify and overcome barriers to effective learning and teaching;
- iv. Facilitate collaboration among HEIs in the region and beyond;
- v. Improve learners' learning, retention and completion;
- vi. Produce high-quality graduates; and
- vii. Increase learners' employability.

In this document, the following definition of Learning Outcomes is used

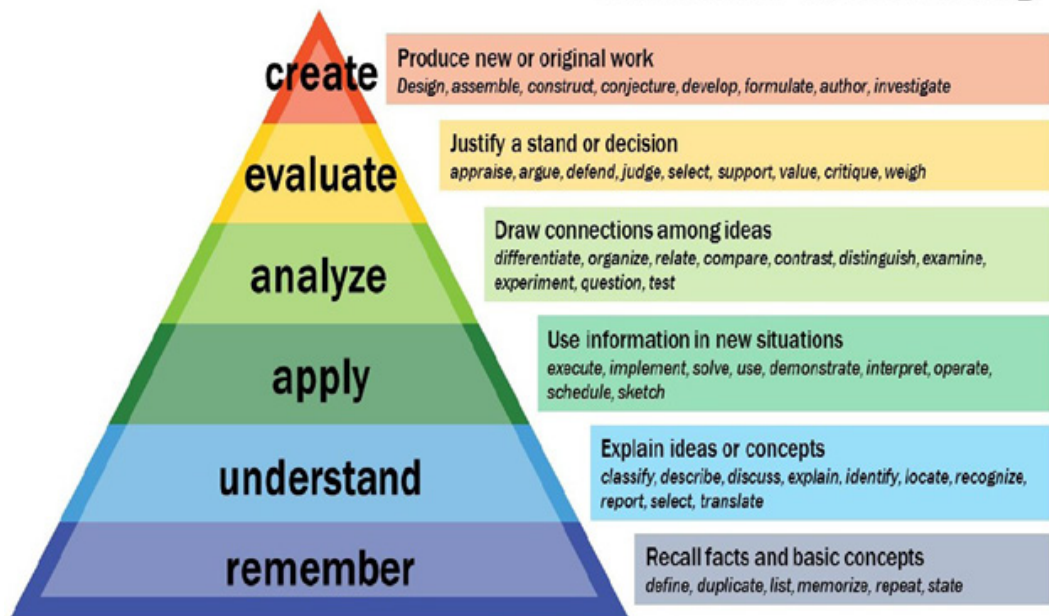
Learning outcomes are statements of the knowledge, skills and attitudes that a learner is able to demonstrate on completion of a learning process.

Learning outcomes can be categorised into three domains:

- i. Cognitive learning (Knowledge)
- ii. Psychomotor learning (Skills)
- iii. Affective learning (Attitudes)

In the Bloom taxonomy, the learning and teaching hierarchy is important for coherent building of knowledge. The cognitive domain comprises six levels, starting with the lowest level of remembering, and ending with the highest level of creating (see Figure 1).

Bloom's Taxonomy



Vanderbilt University Centre for Teaching

Figure 1: Revised Bloom Taxonomy (Biggs, 2021)

In formulating expected learning outcomes, one has to formulate actions, starting at the lowest level of the taxonomy. See, for example, Figure 2.

In this context, course also means module and unit.

Blooms level
 Explanation of
 the level
 Suggested
 verbs to use
 Example

			Creating
			Evaluating
		Analyzing	Evaluating
	Applying	Analyzing	Evaluating
Understanding	Applying	Analyzing	Evaluating
	Understanding		

Remembering	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Develop, Construct, Choose, Make use of, Model, Organize, Plan, Utilize, Build, Apply,			
Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Classify, Compare, Contrast, Describe, Demonstrate, Explain, Illustrate, Outline, Show, Sum				
What, When, Where, Which, Who, why, Recall, List, Match, Define,					
Example: What is the One Health approach? What are the key components of One Health? List the key sectors in One Health. List examples of public-health issues requiring use of OH	Describe key One Health components and show how they can be used to address a One Health challenge.	Develop a One Health intervention strategy that can be applied to tackle a zoonotic disease outbreak in a human-animal and wildlife interface area.	Analyze OH intervention strategies used for managing an AMR problem from a food safety problem in an agro-pastoral community, and test its applicability in addressing those challenges.	Assess the impact of OH interventions in a community deeply grounded in social anthropological values and beliefs, and explain how those values and beliefs can influence the sustainability of such interventions.	Design a One Health Systems thinking model to be used in a One Health intervention requiring multi-sectoral and trans-disciplinary collaboration, and test its robustness in a resource- limited setting.

Figure 2: Formulating Expected Learning Outcomes and actions.

Learning outcomes can be divided into:

- a. Knowledge: the body of facts, principles, theories, and practices that are related to a field of work or study. Knowledge is described as theoretical and/or factual.
- b. Skills: the ability to apply knowledge, and use know-how to accomplish tasks and solve problems. Skills are categorized as:
 - i. Cognitive (involving the use of logical, intuitive and creative thinking);
 - ii. Practical (involving manual dexterity and the use of methods, materials, tools and instruments); and
 - iii. Interpersonal (involving ways of communication, cooperation, etc.).

c. Attitude: a settled way of thinking or feeling about something. Four major components of attitude are: affective (emotions or feelings), cognitive (belief or opinions held consciously), conative (inclination for action), and evaluative (positive or negative response to stimuli).

Figure 3 below shows the relationships between knowledge, skills and attitude. The model is also used to categorize the learning outcomes for Master's degree programme in One Health.

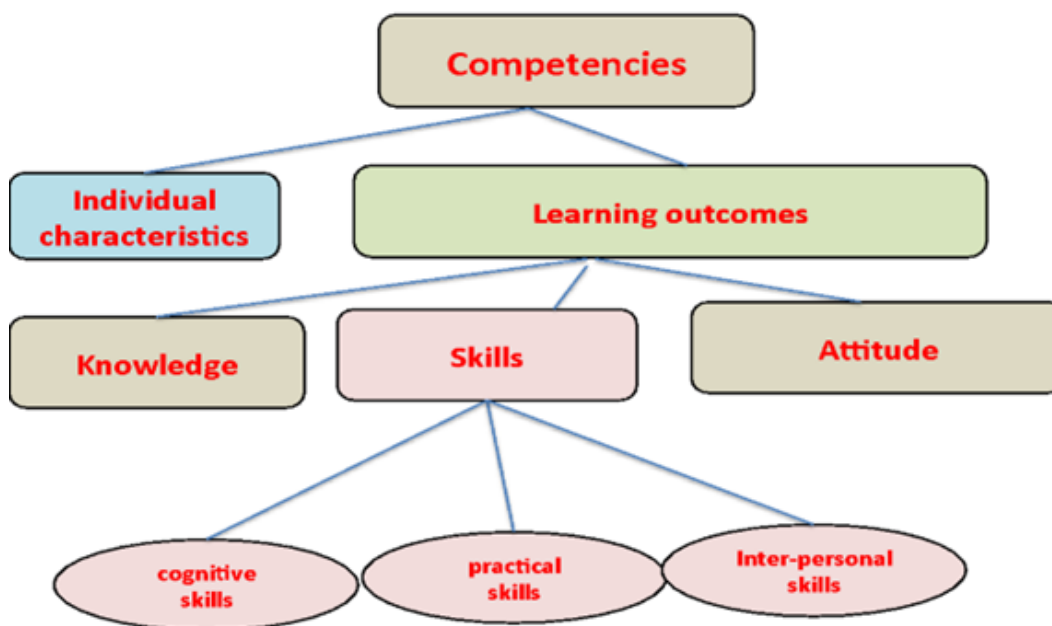


Figure 3: Categorization of Learning Outcomes

In formulating learning outcomes, a distinction has to be made between generic learning outcomes and subject-specific learning outcomes. Generic learning outcomes are those outcomes expected from all academically trained graduates. Examples of generic learning outcomes should focus on: problem solving, communication skills, and ability to cooperate. A key characteristic of a generic learning outcome is that it has to be practices in a specific field; and subject-specific learning outcomes are those that are typical of that discipline.

2.2.3 Translating learning outcomes into the programme

After the formulation of learning outcomes, the next step in the process is to identify what courses are needed to achieve the learning outcomes. A distinction has to be made between core courses and supporting courses. Where supportive courses feature in existing programmes, programme developers or reviewers need to take cognizance of such courses, and consider including them in the programme being developed or reviewed.

A curriculum alignment matrix helps to check if planned courses address the learning outcomes as shown in Table 1.

Table 1: Curriculum Alignment Matrix

Academic programme					
Learning outcomes	Course 1	Course 2	Course 3	Course 4	Course 5
Communication skills	X		X		
Critical thinking		X		X	X
Problem solving					X
Cooperation/working together	X				
Etc.					

2.2.4 Course description

The benchmarks provide the learning outcomes derived from the core courses in the programme. HEIs are expected to develop the courses, starting with the formulation of the learning outcomes for those specific courses. The benchmarks provide a succinct and clear description of each course. An essential part of the programme that will be developed from the benchmarks is the assessment of the extent to which the student has achieved the learning outcomes. Therefore, it is necessary for HEIs to determine how each learning outcome will be assessed.

Details of course description and assessment methods in the Master's degree programme in One Health are provided in Part Three of this document.

2.3 The Benchmarks and Quality Assurance

It is now well established that benchmarks play a significant role in the quality assurance of academic programmes. Regional benchmarks play a significant role in the harmonization of quality of education in HEIs in EAC Partner States. Benchmarks also provide a frame of reference for external assessment teams in assessing the quality of programmes for accreditation. In addition, benchmarks offer a good instrument for HEIs

in evaluating the quality of their own programmes. Although National Commissions and Councils for Higher Education may apply their own criteria in assessing the quality of programmes in the accreditation process, it is expected that they will ideally align their standards with these benchmarks.

2.4 Implementation of the Benchmarks

HEIs and universities in the region are primarily responsible for the implementation of benchmarks through the development and review of academic programmes. The respective National Commissions and Councils for Higher Education are also responsible for oversight roles in the implementation of benchmarks through the use of the benchmarks in the development of minimum programme standards, programme accreditation processes, and monitoring activities. IUCEA will disseminate widely these One Health benchmarks to the different stakeholders, and monitor their implementation in selected HEIs.

2.5 Review of the Benchmarks

These benchmarks are subject to review after every five years to take care of emerging trends in specific disciplines.

PART THREE: BENCHMARKS FOR THE MASTER'S DEGREE PROGRAMME IN ONE HEALTH

3.1 Definition and Description of One Health

One Health is a holistic and integrated systems-based approach that recognizes the interconnection between the health of humans, animals, plants and the environment. One Health is also a collaborative, multi-sectoral, inter-disciplinary approach to improving health and well-being by preventing risks and mitigating crises originating at the interface of humans, animals and the ecosystem. One Health strongly emphasizes coordination, collaboration, and capacity building in its implementation. An effective One Health programme requires management and leadership skills, responsiveness to culture, values and ethics, gender etc.

One Health focuses on complex and multi-faceted challenges associated with zoonotic diseases, antimicrobial resistance, biosafety and biosecurity, food safety and food security, climate change and biodiversity loss, and other environmental issues.

Different authors have advanced different definitions of One Health. The One Health High-Level Expert Panel (OHHLEP), an independent advisory group to the Quadripartite Coalition, defines One Health as:

Box 1

".. an integrated, unifying approach that aims to sustainably balance and optimize the health of humans, animals, plants and ecosystems. It recognizes [that] the health of humans, domestic and wild animals, plants and the wider environment (including ecosystems) are closely linked and interdependent.

Box 2

The approach mobilizes multiple sectors, disciplines and communities at varying levels of society to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, taking action on climate change, and contributing to sustainable development.

3.2 One Health Programme Goal

The goal of the One Health programme is to enable learners to use the OH approach to address current and emerging, complex and multifaceted health issues, through trans-disciplinary methods, professional training, and mentorship, to improve the health of humans, animals, plants and the environment while identifying sustainable system-wide One Health solutions, through quality education of One Health professionals in the EAC region.

3.3 Programme Objectives

The objectives of the Master's degree programme in One Health should be designed in such a way that they address the concerns of different stakeholders. This can be achieved by focusing on the following areas:

3.3.1 Academic ability

The programme objectives under this category are to:

- i. Impart knowledge and skills for developing effective ways to solve complex One-Health issues;
- ii. Impart knowledge in the One-Health approach and its applications;
- iii. Impart knowledge and skills in the One-Health approach that enable creativity and innovativeness in solving complex health threats; and
- iv. Promote research using the One Health approach, and progress to higher levels of learning.

3.3.2 Employability

The programme objectives under this category are to:

- i. Equip students with contemporary One-Health skills;
- ii. Impart to students problem-solving skills for One Health-related tasks;
- iii. Equip students with analytical skills to apply One-Health principles and practices to individuals, organizations and communities;
- iv. Integrate theory and practice to work effectively and efficiently using the One-Health approach; and
- v. Equip students with communication, collaborative, coordination and leadership skills across multidisciplinary and interdisciplinary settings.

3.3.3 Personal development

The programme objectives under this category are to:

- i. Prepare learners for life-long learning and research;
- ii. Empower learners to progress in their personal careers;
- iii. Impart professional ethics to the learners;
- iv. Equip learners with skills and attitudes to work in multicultural and global environments;
- v. Equip learners with knowledge and skills to work as a team in the One-Health field; and
- vi. Enable learners to develop skills to perform effectively in technical and non-technical environments.

3.4 Expected Learning Outcomes (ELO's)

For the Master's degree programme in One Health to be relevant, consistent and coherent across the region, the following benchmark expected learning outcomes (ELO's) have been developed to guide HEIs in developing programmes in One Health.

The formulated ELO's are thresholds that all graduates of the Master's degree programme in One Health are expected to attain. HEIs may consider adopting additional learning outcomes as and when necessary, in line with their mission and vision or other identified need(s). The expected learning outcomes for a Master's degree programme in One Health are outlined in Table 2.

Table 2: Expected Learning Outcomes for the Master's degree programme in One Health

Knowledge and understanding	<p>The learner should be able to demonstrate:</p> <ol style="list-style-type: none"> 1. A systematic and comprehensive understanding of the main areas of One Health; 2. A critical awareness of current problems and/or new insights at the forefront of the One-Health discipline; 3. A comprehensive understanding of relevant techniques applicable to his/her research or advanced scholarship in One Health; and 4. An understanding of how established techniques of research and enquiry are used in One Health.
Practice: applied knowledge and understanding	<p>The learner should be able to:</p> <ol style="list-style-type: none"> 5. Use relevant skills, techniques, practices and/or materials to design interventions in One Health; 6. Apply a range of standard and specialized research methods or equivalent techniques of enquiry in addressing human, animal and environmental, emerging issues in One Health; 7. Plan and carry out a significant project of research, investigation, or development in One Health; 8. Demonstrate innovativeness in the application of knowledge in One Health;

Generic cognitive skills	<ol style="list-style-type: none"> 9. Deal with complex issues, and make informed judgments in the absence of sufficient data; 10. Analyze, evaluate and synthesize issues at the forefront of knowledge in One Health; and 11. Respond appropriately to problems and issues in One Health.
Communication, ICT and numeracy skills	<p>The graduate should be able to use appropriately a range of the following advanced and specialised skills:</p> <ol style="list-style-type: none"> 12. Effective communication, using a range of appropriate methods to a range of audiences with different levels of One-Health expertise; 13. Appropriate communication with peers, senior colleagues, stakeholders and community members; 14. Use of a wide range of appropriate ICT-based solutions to communicate risk assessment techniques, and reporting and management approaches to One health; and 15. Interpretation and analysis of a wide range of numerical and graphical information, applicable to One Health.
Autonomy, responsibility and working with others	<p>The graduate should be able to:</p> <ol style="list-style-type: none"> 16. Collaborate and partner with other players and stakeholders on matters of One Health; 17. Demonstrate self-direction and creativity in tackling and solving One Health problems; 18. Act autonomously in planning and implementing professional decisions; 19. Manage stress in difficult work environment; 20. Work in a multi-cultural environment with respect to gender, religion, ethnicity, nationality and race; 21. Demonstrate the skills of life-long learning in One Health; 22. Demonstrate the skills of leadership and resource management in One Health; and 23. Uphold ethical and professional values in One Health

3.5 Translating the Learning Outcomes into the Basic Phase of the Master's Degree programme in One Health

The learning outcomes in the benchmarks have been translated to the Master's degree programme in One Health, as demonstrated in the courses described in the benchmarks.

In the context of these benchmarks, a programme is understood as a coherent set of courses leading to a Master's degree in One Health. The Master's degree programme may be constituted of courses, modules or units. This benchmark framework has been structured into core courses and supportive courses.

Core courses (or subject areas)

These are the essential courses that typify the philosophy and foundation of the discipline. The core courses are the backbone of the discipline, and they are the typical One-Health courses mandatory for every learner at this level.

Supporting courses (or subject areas)

These are courses that supplement the core courses, without which it may be difficult to understand the core courses. These courses are also compulsory for all students.

Table 3 shows the core and supporting courses in a Master's degree programme in One Health. The following should be noted about the core and supporting courses in Table 3:

- i. The titles of the courses may differ from one HEI to another. The emphasis should be on content rather than title. For each core course, a short description is given;
- ii. The autonomy and uniqueness of HEIs should be taken into consideration in formulating the supportive courses listed in this benchmark document. Each HEI may opt to adopt additional courses beyond the core and supporting courses; and
- iii. The programme may be designed in the form of modules or courses as per national requirements by the Councils and Commissions for Higher Education or any other regulatory body.

3.6 Expected Competencies

- i. Demonstrated knowledge and understanding of One-Health principles.
- ii. Ability to use the One-Health approach to solve complex health issues.
- iii. Ability to promote systems thinking in One Health.
- iv. Knowledge of trans-disciplinary concepts.
- v. Ability to choose and design the best responses to One-Health issues.
- vi. Ability to showcase leadership, advocate for change, manage cross-disciplinary teams, and understand the roles and responsibilities of the team and its individual members.
- vii. Ability to communicate effectively and engage with all One-Health stakeholders.
- viii. Ability to understand historical, gender, cultural, social, political, economic and scientific aspects of complex and emerging and re-emerging health threats.

3.7 Courses in the Master's Degree Programme in One Health

Table 3: Core and supporting courses for the Master's Degree Programme in One Health

Core Courses	Supporting Courses
1. Fundamentals of Public Health Policy	1. Social Anthropology
2. Foundations of One Health	2. Zoonoses, Emerging & Re-Emerging Infectious Diseases
3. Infection, Prevention and Control of Diseases	3. Epidemiology
4. Risk Analysis in Public Health Emergencies	4. Climate Change and Biodiversity
5. Leadership, Governance and Management in One Health	5. Monitoring and Evaluation in One Health
6. Ethics, Values & Integrity in One Health	6. Health promotion & Behavioural Change
7. Ecosystem Health	7. Biorisk Management
8. One-Health Systems Thinking	8. Antimicrobial Resistance
9. One Health Partnerships, Advocacy & Collaboration	9. Infectious Disease Management
10. Research Methods & Biostatistics	10. Food Safety and Management Systems in One Health
11. One-Health Community Engagement	11. Mental Health and Psychosocial Support
12. Experiential Field Learning	12. Traditional & Complementary Medicine
13. Research Project (Thesis/Dissertation)	13. Gender in One Health

3.8 Learning Outcomes and Curriculum Alignment Matrix

As already mentioned in Sub-section 2.2.3 above, to establish whether the planned courses cover the learning outcomes, it is important to develop a curriculum alignment matrix. For each course, one has to formulate specific learning outcomes, and assess the extent to which the course contributes to the program learning outcomes.

Table 4 below shows the curriculum alignment matrix for the expected learning outcomes of the Master's degree programme in One Health, indicating the contribution of each course to the realization of the expected learning outcomes of the programme.

Table 4: Expected learning outcomes and courses alignment Matrix Expected Learning Outcomes, (For explanation of the numbers see Table 2)

Core Courses	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Fundamentals and Principles of Public Health Policy	X	X			X	X	X	X	X	X	X	X				X	X	X	X	X	X	X	X
Principles/Foundations of One Health	X	X			X	X	X	X	X	X	X	X				X	X				X	X	X
Infection, Prevention and Control of Diseases	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X
Risk Analysis in Public Health Emergencies	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Leadership, Governance and Management in One Health		X			X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X
Ethics, Values & Integrity in One Health		X						X	X	X	X	X	X			X	X	X	X	X	X	X	X
Ecosystem Health	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
One Health Systems Thinking	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
One Health Partnerships, Advocacy, and Collaboration		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Research Methods and Biostatistics		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
One Health Community Engagement		X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Experiential Field Learning	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Research Project (Thesis/Dissertation)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Supportive courses																							
Social Anthropology	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Zoonoses, Emerging and Re-emerging Infectious diseases	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Epidemiology	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Climate Change and Biodiversity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Monitoring and Evaluation in One Health	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Health Promotion & Behavioral Change	X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

3.9 Course Description

In this document, the learning outcomes of the program are provided. Each higher education institution will have to develop the detailed content of each course, starting with the formulation of the learning outcomes. For each course, a brief description is provided below. An essential part of the program is to assess how far the student has achieved the learning outcomes. Therefore, it is necessary for the HEIs to decide how each learning outcome will be assessed. Co

3.9.1 Core courses

3.9.1.1 Fundamentals of Public Health Policy

This course introduces students to the fundamental principles, concepts, and methods used in public health and policy. The course covers a range of topics related to public health, such as the determinants of health, disease surveillance, health behavior, epidemiology, and health promotion. It also covers key policy and ethical issues in public health, including health disparities, health systems, health financing, and social and environmental determinants of health.

3.9.1.2 Foundations of One Health

This course introduces learners to the principles and foundations of One Health, an emerging concept that recognizes the interconnectedness of human, animal, and environmental health. The course covers the theoretical foundations and practical implications of the One Health approach, including its relevance to public health, veterinary medicine, and environmental health. Additionally, the course explores the socioeconomic, cultural and environmental drivers of health and the impacts of climate change on health and wellbeing. It also covers the origins, evolution, scope and fundamental pillars of One Health, and the role of the One Health approach in combating zoonotic diseases, AMR, biosafety and biosecurity among others.

3.9.1.3 Infection, Prevention and Control of Diseases

This course provides an overview of the principles and practices of disease infection, prevention and control. The course covers the basic principles of infection, prevention and control, including chains of pathogens, community and health care, and associated infections and prevention strategies. Additionally, the course explores the role of infection, prevention and control (IPC) in disease management.

3.9.1.4 Risk Analysis in Public Health Emergencies

This course is designed to equip learners with specific skills needed to design and implement interdisciplinary surveillance and outbreak investigations for effective outbreak response during public health emergencies, using the IDSR model. The course

combines theory with outbreak investigation, case studies and simulations based on real-life outbreaks. It also focuses on the use of risk assessment frameworks; the application of appropriate epidemiological findings and evidence; risk communication principles; and appropriate interventions to control outbreaks.

3.9.1.5 Leadership, Governance and Management in One Health

This course introduces students to the principles of leadership and management, management functions and leadership planning and control. In addition, it covers One Health leadership and management skills, comparative analysis of leadership and management, and leadership styles in relation to emergency and pandemic response.

3.9.1.6 Ethics, Values and Integrity in One Health

One Health is concerned with complex societal problems the mitigation of which requires high ethical values and standards. This course aims at helping learners to understand professional ethics, research ethics, values, and integrity in One Health. It also examines the application of ethical principles in resolving One-Health problems.

3.9.1.7 Ecosystem Health

The health of ecosystems depends on their structure and function, and plays a critical role in the health of the human, animal and plant populations they interact with. This course provides insights into ecosystem health within the wider context of One Health. It also examines methods of, and approaches to, defining and assessing ecosystem health and integrity, to understand ecosystem stability and functioning within the context of One Health.

3.9.1.8 One Health Systems Thinking

This course introduces the concepts of systems and systems thinking, and covers the principles and methods of systems thinking and their application to One Health, including the integration of complex systems and the identification of interdependencies. It also focuses on inter-relationships among system elements, and the interactions of systems in complex and unpredictable environments to influence outcomes in pandemics and emergency situations.

3.9.1.9 One Health Partnership, Advocacy and Collaboration

This course examines the imperative of engaging a wider range of One- Health stakeholders by building dynamic partnerships and collaborative consortia, for a successful implementation of One-Health interventions. It focuses on developing advocacy strategies to promote One Health principles and policies at local, national, and global levels and exploring effective strategies for building and sustaining partnerships among diverse stakeholders.

3.9.1.10 Research Methods and Biostatistics

This course introduces students to the principles of research and its application. It focuses on research designs, data collection, and analysis of evidence-based information for decision making. The course also examines advanced methods of scientific research analysis, academic and scholarly writing of research findings, and bio-statistic methods in health among other topics.

3.9.1.11 One Health Community Engagement

This course focuses on the role of community engagement in One Health response. In addition, it examines culture and pandemics: beliefs, religions, mass gatherings, burials, superstitions, myths, community dynamics, opinion leaders and influencers, community dynamics, power and relationships, sources of information, community beliefs and practices, available resources, health-seeking behavior, indigenous and modern knowledge and skills (e.g., community by-laws; impact of pandemics on communities; community response to pandemics; community education/sensitization about pandemics; community development agents and roles, social mobilization, community engagement phases planning, implementation, and challenges of community involvement in pandemic preparedness and response).

3.9.1.12 Experiential Field Learning

The Experiential Field Learning course offers learners a unique opportunity to integrate OH theoretical knowledge with practical experiences in real-world settings. This course is designed to foster deep learning through hands-on engagement, allowing learners to engage in real-life situations in a selected community/organization to identify OH challenges or design and implement a OH intervention with the guidance from a mentor to support their personal and professional development. It focuses on developing essential professional skills, including communication, problem-solving, teamwork, and adaptability, through field experiences. At the conclusion of the course, learners will complete a culminating project that demonstrates their learning and accomplishments during field experiences in a form of a research paper, presentation, portfolio, or creative work, showcasing ability to apply knowledge in practical contexts.

3.9.1.13 Research Project (Thesis/Dissertation)

Research Project (Thesis/Dissertation) is a mandatory requirement of the Master's degree programme in One Health. The research shall be conducted on a topic relevant to One Health and data collected in a One- Health setting. Each student researcher shall have a supervisor, and in as much as possible, supervisors shall have a background in One Health as a discipline. The research project shall be assessed by a supervisor and at least two independent examiners who did not supervise the student and each student shall defend his/her dissertation in a viva voce. The work shall demonstrate a high level of synthesis, analysis, articulate complex ideas and defend their methodology, conclusions and practical application.

3.10 Supportive Courses

3.10.1 Social Anthropology

The course explores anthropological approaches to society, culture, history, and current events in relation to One Health. It focuses on the social and cultural aspects of health and disease, and how they affect human, animal and plant health. It also examines cross-cultural perspectives, anthropological thoughts, anthropology in public health, environmental anthropology, anthropological debates, qualitative methods in anthropology, and ethical issues in social anthropology among other topics.

3.10.2 Zoonoses, Emerging & Re-emerging Infectious Diseases

This course focuses on the concepts and principles of zoonoses and the classification of emerging and re-emerging infectious diseases (bacterial, viral, fungal, parasitic, vector and food-borne) in the context of One Health. It also examines the key drivers, risk factors, transmission modes, and reporting mechanisms of the emergence and re-emergence of zoonoses and other infectious diseases. This course also focuses on the wildlife-livestock-human interface and host-pathogen-environment interactions and the impact of zoonoses.

3.10.3 Epidemiology

The course focuses on the principles and practices of epidemiology in a One-Health context, and it covers the key aspects of epidemiology, including the principles of disease occurrence, distribution, and determinants. The course also covers the basics of surveillance systems for infectious and non-infectious diseases, analysis of epidemiological data, measures of associations, and interpretation of results of epidemiological studies in a One-Health context.

3.10.4 Climate Change and Biodiversity

The course focuses on climate change, biodiversity and disasters, and their impact on the health and integrity of ecosystems. It also examines strategies of mitigating the health risks associated with climate change and biodiversity loss.

3.10.5 Monitoring and Evaluation in One Health

This course focuses on the main concepts and methods in programme monitoring and evaluation in a One-Health context, and it examines data needs, data use, evaluation frameworks, monitoring, and implementation mechanisms. In particular, the course seeks to impart practical skills for undertaking monitoring and evaluation of One-Health programmes or interventions.

3.10.6 Health Promotion and Behavioral Change

The course focuses on the core principles and notions of health promotion, behavioral change models, communication, and application of health-promotion principles in One-Health interventions. The course also covers the health promotion planning cycle, intervention mapping, stakeholder involvement, and the implementation of interventions.

3.10.7 Biorisk Management

The course focuses on the concept of biorisk management which combines Assessment, Mitigation and Performance (AMP) model to assess biological risk, mitigating risk, implementing an effective risk management solution, and continually improving the risk management system in bioscience facilities and animal handling facilities. Other biorisk management issues covered include occupational safety, bio-containment facilities, laboratory equipment, incident management, audits, inspections, and the shipping of biological specimens. The course also covers relevant national, regional and international biosafety/biosecurity legislations, standards, and guidelines in the context of One Health.

3.10.8 Antimicrobial Resistance

This course focuses on the principles of antimicrobial resistance (AMR) and its implications for human, animal, and environmental health. It also covers the mechanisms, drivers, and burden of antimicrobial resistance, and examines strategies for surveillance, testing, reporting, prevention and control of antimicrobial resistance.

3.10.9 Infectious Disease Management

The course focuses on the management of infectious diseases, using the One-Health approach, and it examines epidemiology, transmission, clinical presentation, diagnosis, treatment, prevention and control of infectious diseases in both humans and animals. Other topics covered include the One-Health approach and its interconnectedness to human, animal, and environmental health, infectious disease outbreaks, the use of accurate information from surveillance to guide the management of infectious diseases, and the design and implementation of a One-Health action plan for infectious disease management.

3.10.10 Food Safety and Management Systems in One Health

This course focuses on the fundamentals of food safety, environmental sanitation, and basic principles of a food safety management systems in formal and informal sectors. It also examines zoonotic foodborne illnesses, public-health principles, food and feed adulterants and contaminants, and mitigation measures. Finally, it considers national, regional and international regulations, standards and guidelines on food safety.

3.10.11 Mental Health & Psychosocial Support in One Health

This course focuses on concepts of mental health and psychosocial support, mental distress and dysfunction among healthcare providers and vulnerable groups during One-Health interventions. It also covers the causes, risks, and impact of mental distress and dysfunction in pandemic situations, and the design and application of tools in the diagnosis and management of mental health disorders, and in the provision of first-line psychosocial support.

3.10.12 Traditional and Complementary Medicine in One Health

This course focuses on the role of traditional healthcare practices in the management of human and animal health issues and the environment. It also covers the application of the systems framework to solve human, animal, plant and environmental health problems; and it examines the use of traditional indigenous knowledge and mythical systems in the detection and prevention of emerging diseases.

3.10.13 Gender in One Health

This course covers gender issues in One Health, focusing on disease burden and impact in relation to gender, the diverse roles that males and females play, the gender-differentiated levels of exposure to triggers of diseases, and of interaction with the environment. It also covers the design of gender-responsive, One-Health interventions.

GLOSSARY

Term	Definition
Attitude	A settled way of thinking or feeling about something
Benchmark	A point of reference against which something may be measured
Benchmark standards	Subject benchmark statements that set out expectations about standards of degrees in a range of subject areas. They describe what gives a discipline its coherence and identity and define what can be expected of a graduate in terms of the abilities and skills needed to develop understanding or competence in the subject.
Competencies	Individual characteristics and learning outcomes in the form of practical abilities attained by a learner
Core subject	An essential subject providing a thorough foundation of a discipline, and constituting the backbone of a discipline.
Course (unit)	A self-contained, formally structured learning experience. It should have a coherent and explicit set of learning outcomes and appropriate assessment criteria. Course /units can have different numbers of credits.
Curriculum alignment matrix	An instrument for checking and portraying the contribution of a course, unit or module to the achievement of programme learning outcomes.
Elective subjects	Subjects out of which a student has to make a selection, to deepen or to broaden their learning experience in a programme.
Equivalency	Having the same value, without being uniform or identical
Generic learning outcomes	Learning outcomes that all trained academic graduates are expected to realize irrespective of their respective study programmes. Examples of generic learning outcomes are problem solving, communication skills, and ability to cooperate.
Harmonization	The comparability of all academic programmes in the region, based on agreed benchmarks.
Internship	A period of supervised training at a workplace, which is an important part of a study programme. It offers the student the opportunity to become acquainted with his /her future job, by providing him/her with experiences at the working floor level.
Knowledge	The body of facts, principles, theories and practices that are related to a field of work or study. It is the outcome of the assimilation of information through learning, and is both theoretical and factual.

Term	Definition
Learning outcomes	Statements of what a learner knows, understands and is able to do during and by the end of a learning process, which are defined in terms of knowledge, skills and attitude.
Master's degree	A degree in which the holder of the qualification is expected to display mastery of a complex and specialized area of knowledge and skills, employing knowledge and understanding to conduct research or advanced technical or professional activity, and to work autonomously in complex and unpredictable situations.
Module	A formal learning experience encapsulated into a block of study, usually linked to other modules to create a programme of study.
Module description	A statement of the aims, objectives, learning outcomes, content, learning and teaching processes, mode of assessment of students and learning resources applicable to a block of study.
National Qualification Framework (NQF)	The policy framework that defines all qualifications recognized nationally in post-compulsory education and training within a country. The NQF comprises titles and guidelines, which define each qualification, together with principles and protocols covering articulation and issuance of qualifications, and statements of attainment.
Programme	A set of coherent educational components, based on learning outcomes, that are recognized for the award of a specific qualification, through the accumulation of a specified number of credits and the development of specified competences.
Programme objectives	Overall specification of the intention or purpose of a programme of study
Project work	A problem-oriented form of study, normally based on an actual, existing problem which may be linked to internship, and leads to possible solutions. A project may be practical or research oriented.
Qualifications framework	An instrument for the development and classification of qualifications according to a set of criteria for levels of learning and skills and competences achieved
Skills	The ability to apply knowledge and use know-how to accomplish tasks and solve problems.
Standards	Explicit levels of academic attainment, which are used to describe and measure academic requirements and achievements of individual students and groups of students.

Term	Definition
Subject-specific learning outcomes	Those learning outcomes are typical for a given discipline. See also generic learning outcomes.
Supporting subjects	Subjects that supplement or complement core subjects, and without which the core subjects would not be fully understandable.



Plot M833, Kigobe Road Kyambogo,
Kampala, Uganda.
P.O.Box 7110, Kampala, Uganda
Telephone: (+256) 414256251/2
Email: info@iucea.org
Twitter: [@iucea_info](https://twitter.com/iucea_info)