THE TANZANIA COMMISSION FOR UNIVERSITIES

BENCHMARKS FOR THE DOCTOR OF MEDICINE (MD)/BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBBS/MBChB) PROGRAMME

FEBRUARY 2022

Published by:
The Tanzania Commission for Universities
Ministry of Education, Science and Technology Building, Ground Floor
P. O. Box 6562, 7 Magogoni Street, 11479 Dar es Salaam
Tel. Gen: +255(0) 22 2113694, Fax: 255 22 2113692
E-mail: es@tcu.go.tz
Website: www.tcu.go.tz

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

ALP	Academic Learning Project
APHTA	Association of Private Health Practitioners in Tanzania
BScN	Bachelor of Science in Nursing
CATS	Credits Accumulation Transfer System
CBE	Competency-Based Education
CLO	Course Learning Outcomes
CM	Curriculum Map
CPD	Continuing Professional Development
CUHAS	Catholic University of Health and Allied Sciences
DOPS	Direct Observation of Procedural Skills
EAC	East African Community
ELO	Expected Learning Outcomes
FA	Formative Assessment
FIC	Fogarty International Centre
GRE	Graduate Minimum Essential
HEIs	Higher Education Institutions
HKMU	Hubert Kairuki Memorial University
HLI	Higher Learning Institution
ILO	Intended Learning Outcomes
IUCEA	Inter-University Council for East Africa
KCMUCo	Kilimanjaro Christian Medical University College
LOs	Learning Outcomes
MBBS	Bachelor of Medicine and Bachelor of Surgery
MBChB	*Medicinae Baccalaureus, Baccalaureus Chirurgiae* (Bachelor of Medicine and Bachelor of Surgery)
MCHAS	Mbeya College of Health and Allied Sciences
MCQ	Multiple Choice Questions
MCT	Medical Council of Tanganyika
MD	Doctor of Medicine
Mini CEX	Mini-Clinical Evaluation Exercise
MLO	Module Learning Outcomes

MoEST	Ministry of Education, Science and Technology
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MoU	Memorandum of Understanding
MUHAS	Muhimbili University of Health and Allied Sciences
NIH	National Institute of Health
NIMR	National Institute of Medical Research
NQF	National Qualifications Framework
OBE	Outcome-Based Education
OSCE	Open Structured Clinical Examination
OSPE	Objective Structured Practical Examination
PCT	Pharmacy Council of Tanzania
QA	Quality Assurance.
QF	Qualification Framework
SA	Summative Assessment
SEDP	Secondary Education Development Programme
SLO	Students Learning Outcome
TCU	Tanzania Commission for Universities
THET	Transforming Health Professions Education in Tanzania
TLS	Tanganyika Law Society
TNMC	Tanzania Nurses and Midwifery Council
UCSF	University of California San Francisco
UDOM	University of Dodoma
UQF	University Qualification Framework
ZMC	Zanzibar Medical Council
ZNMC	Zanzibar Nursing and Midwifery Council

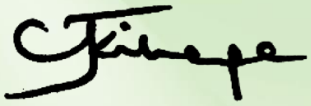
ACKNOWLEDGEMENTS

The MD/MBBS/MBChB programme benchmarks could not have been realized if not due to dedication from medical and other experts from various institutions who conceived the idea and embarked on the work for benchmarks development. I, therefore, acknowledge several individuals from various health University institutions, health stakeholders and partners to whom I extend my most sincere appreciations for making it possible to develop these benchmarks. I would like to express my gratitude to the technical team, drawn from MUHAS, CUHAS and KCMUCo (The THET consortium), and TCU for developing the benchmarks document to its final state. I thank Professor Ephata Kaaya, Prof. Gideon Kwesigabo, Professor Eligius Lyamuya, Dr. Doreen Mloka, Professor Lilian Mselle, Dr. Nathanael Sirilli, Professor Alfred Mteta, Professor Levina Msuya, Dr. Jane Rogathi, Professor Stephen Mshana and Dr. Rose Laizer for working on the idea and for guiding the process of benchmarks development to completion.

My special gratitude is extended to the Commission members for their invaluable contributions, leadership, and guidance. In particular, I wish to acknowledge the late Professor Mayunga H. Nkunya, the then Chairman of the Commission, not only for his guidance from the very beginning of the benchmarks' development process, but for initiation of the health professions transformation to Competency-Based Education in 2007/8.

The Medical Council of Tanganyika (MCT), the Tanzania Nurses and Midwives Council (TNMC), the Pharmacy Council, the Medical Association of Tanzania (MAT), the Forum of Universities and Colleges of Health Sciences in Tanzania (FUCHS-T) are highly acknowledged for their instrumental contributions in the development of the benchmarks. The former Chief Medical Officer, Ministry of Health, Community Development, Gender, Elderly and Children (Prof. Muhamad Bakari), the Permanent Secretary, Ministry of Education Science and Technology, Dr. Leonard Akwilapo, are immensely appreciated for extending their support to facilitate this process. I expect that these benchmarks will provide an essential building block of the harmonization of Health Profession programmes in Tanzania and the EAC Region towards creating a common East African Higher Education Area. I hope that they will be used by all stakeholders for intended

purposes such as curriculum development and review, assessing graduates' competencies, and comparability.



Prof. Charles Kihampa
Executive Secretary, TCU

Dar es Salaam, February 2022

FOREWORD

The Tanzania Commission for Universities (TCU) is the regulatory authority for higher education in Tanzania under the Universities Act No. 7 of 2005 (Cap 346, of the Tanzania Laws). TCU has the mandate to recognize, approve, register, and accredit Universities operating in Tanzania and local or foreign university-level programmes offered by registered higher learning institutions (HLIs). TCU is also responsible for ensuring that all programmes offered in the Universities are harmonized, validated, and meet the required quality standards in line with the Quality Assurance initiative promoted by the Inter-University Council of East Africa (IUCEA) for universities in the East African Community (EAC). In line with the spirit of promoting Quality Assurance in HLIs in the EAC, IUCEA developed "The Handbook A Roadmap to Quality" to guide the development of harmonized, programme-specific benchmarks for use in universities in the region.

TCU has the strategic role of coordinating and regulating the development of quality curricula appropriate for the various programmes in HLIs to train competent human resources in Tanzania. Such programmes are supposed to meet the IUCEA higher education benchmarks quality standards that address the local perspectives to promote the international competitiveness of universities in the East African region and beyond. So far, TCU has not yet developed benchmarks for subject-specific health sciences programmes for the HLIs in the country. There has been a long-standing strong drive to develop competence-based curricula in the health sciences disciplines to train health professionals who have the desired competence and skills to provide quality health care services to our people, both in health care facilities and in the community.

Between 2009-2011, through support from Bill and Melinda Gates Foundation Grant called the Academic Learning Project (ALP), the Muhimbili University of Health and Allied Sciences (MUHAS) transformed its undergraduate and postgraduate education from the traditional input-based to Competence-Based Education (CBE) programmes. Through the support of an NIH-supported project called "Transforming Health Professions Education in Tanzania (THET)", whose goal was to transform the educational environment for doctors

and nurses to deliver quality care and improve health outcomes for Tanzanian people, the existing competency-based programme for training doctors was harmonized for use by the three partner institutions in the consortium namely, the Catholic University of Health and Allied Sciences (CUHAS), Kilimanjaro Christian Medical University College (KCMUCo) and MUHAS. During the harmonization process, THET involved the relevant key stakeholders including the TCU, Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC); the Ministry of Education, Science and Technology (MoEST); the professional councils for health disciplines {Medical Council of Tanganyika (MCT), Tanzania Nurses and Midwifery Council (TNCM), and the Pharmacy Council}. After completing the harmonization process, TCU felt it prudent to adopt the harmonized curricula and developed benchmarks for use across the country's undergraduate medical degree training HLIs. Subsequently, TCU will oversee development of benchmarks for other health-related disciplines (Pharmacy, Dentistry, Health Laboratory Sciences, Environmental Health Sciences, Rehabilitation Medicine Sciences, Occupational Health and Biomedical Engineering).

On behalf of the TCU, I wish to encourage all stakeholders involved in training doctors in Tanzania to adopt and operationalize the undergraduate medical doctor degrees' benchmarks. Therefore, my sincere expectation is that the University Institutions entrusted with medical doctors' training in the country will use these benchmarks in all educational processes to ensure that our programmes produce medical graduates of the expected quality.

EXECUTIVE SUMMARY

The Benchmarks for Doctor of Medicine (MD)/Bachelor of Medicine and Bachelor of Surgery (MBBS/MBChB) contained in this document were developed as one of the milestones for harmonizing the Tanzania higher education programmes and precisely the health sciences programmes. The document is essential in the Tanzania Quality Assurance Framework and to further contribute to the development of the National Qualifications Framework and the implementation of the University Qualifications Framework (UQF) but at the regional level will contribute to the East African Common Higher Education Area in Health Sciences.

The MD programme is similar to MBBS/MBChB programmes; thus, these benchmarks should also apply to the development of MBBS and MBChB programmes in Tanzania. However, the programme also has some commonalities with other health professions programmes, providing a good template for developing benchmarks for the other health programmes at the university level.

The benchmarks provide means for the academic community to describe the nature and characteristics of programmes in the medical discipline. They further provide general expectations on standards for the award of a medical degree qualification and articulate the attributes and capabilities that graduates possessing such qualifications should be able to do. In addition, they address the level at which the undergraduate qualification for medicine might be placed within the University Qualifications Framework (UQF) in Tanzania. The benchmarks include expressions of the professional/employment-related abilities that graduates in medicine would be expected to have developed during their higher education and associated practice-based experiences. These align with the professional abilities expected in the undergraduate degree descriptor within the UQF.

The MD/MBBS/MBChB benchmarks are to be used for several purposes. Foremost, they are an important source of reference for higher education institutions when new medical undergraduate programmes are being designed and developed. The benchmarks provide general guidance for articulating the learning outcomes associated with the MD/MBBS/MBChB, but they do not specify a detailed undergraduate medical degree curriculum. The benchmarks

provide for variety and flexibility in designing new programmes or revision of ongoing programmes and encouraging innovation within an agreed overall framework. The benchmarks also provide support to institutions in pursuit of internal quality assurance. They enable the learning outcomes specified for the programme to be reviewed and evaluated against agreed general expectations and standards.

Finally, the benchmarks may be one of several external reference points drawn upon for external review of the MD/MBBS/MBChB programmes. However, reviewers should not use the benchmarks as a simple checklist for these purposes. Instead, they should use them in conjunction with the relevant programme specifications and the health professions' University Institution's internal evaluation tools to allow reviewers to come to a sound judgment based on a broad range of evidence. Thus, the main objective of benchmarks is to harmonize the MD/MBBS/MBChB programme by providing a baseline for comparability of the undergraduate medical degree programmes in the country and to ensure relevancy of the programmes. The benchmarks will also be used as yardstick or a point of reference and not as absolute standards. This benchmarks document is organised in three parts: -

(i) **Part 1** describes the background, objectives, and justification for the formulation of the benchmarks. It also articulates the development process and formulation of the benchmarks.

(ii) **Part 2** shows the relation between the benchmarks and the Qualification Frameworks, the Curriculum, and the link with Quality Assurance.

(iii) **Part 3** presents the benchmarks for the undergraduate medical degree (MD/MBBS/MBChB) programme.

PART 1: INTRODUCTION

1.1 Background

Tanzania Commission for Universities (TCU) is mandated to maintain high and comparable academic standards in Higher Education in Tanzania, emphasizing Quality Assurance (QA) and Quality Management. Thus, TCU, among others, is mandated to Standardize, recognize, and equate degrees, diplomas, and certificates conferred or awarded by foreign institutions and local institutions; and establish and maintain a qualifications framework for universities.[1]

TCU aspires to operate within stakeholders' expectations in delivering regulatory functions that enhance and harness QA in Tanzania. The concept of QA in University Institutions is of immeasurable concern among all stakeholders in Tanzania, including the policymakers, parents, employers, and students.[2] This importance rests on the fact that Tanzania has experienced a rapid expansion of university institutions and rapid growth in universities and colleges' enrolment levels in recent years. This was triggered by the exponential increase in demand for higher education due to the successes scored in the Primary Education Development Programme (PEDP)[3] and Secondary Education Development Programme (SEDP).[4] This rapid growth of enrolment levels in the Universities has been experienced across the board, including health sciences University institutions.

Given this situation, TCU felt the need to ensure that the rapid expansion of higher education[5] did not compromise the quality of the very education delivered. In recent years student mobility in East Africa has increased, creating the need to institute mechanisms for harmonization and comparability of the quality of education in universities in the region. There is, therefore, a reason to enhance efforts for safeguarding and maintaining international quality standards in Tanzania to support similar efforts in the East African Common

[1] URT (2005). The Universities Act No 7, 2005. Dar es Salaam MHEST, 2005 (Section 5(1) (f),
[2] Mosha H: The State and Quality of Education in Tanzania: A Reflection. University of Dar es Salaam
[3] URT, Education Sector Development Programme, Primary Education Development Plan (PEDP) I-2000-06, PEDP II 2007 - 11, PEDP III 2012-16.
[4] URT, Education Sector Development Programme Secondary Education Development Plan (SEDP) 2004 – 2009.
[5] Laiser S: An Assessment of Factors Influencing Mushrooming of Private Higher Learning Institutions in Tanzania: A Theoretical Perspective. Tanzania Journal of Education, 3: 112-125, 2017.

Education Area. In Tanzania, the measures are addressed and implemented in collaboration with national and International Quality Assurance frameworks, making benchmarks a necessity.

The Inter-University Council for East Africa (IUCEA) championed and developed the first regional benchmarks on the Bachelor of Business-related studies within the East African Region. Based on the experiences with the benchmarks for Business-related studies in the region, the IUCEA took the initiative to develop benchmarks for the Bachelor of Computer Science and the Bachelor of Information Technology through the Regional Quality Assurance Initiative framework.[6] Using the regional experience in formulating benchmarks, TCU initiated the development of the undergraduate medical degree (MD/MBBS/MBChB) programme benchmarks for Tanzania.

The objectives of the formulated benchmarks are to:

(i) Act as a guide and tools for the Tanzania Health Science Colleges and Universities in designing the MD/MBBS/MBChB, Programmes.
(ii) Enable the TCU and other stakeholders to assess the quality of the MD/MBBS/MBChB, Programmes.
(iii) Promote harmonization of MD/MBBS/MBChB programme across the country.
(iv) Support staff and student mobility within Tanzania and in the East African Region.
(v) Support the nationalization and regionalization of the labour market, as one of the East African Community (EAC) common Higher Education Area aims.
(vi) Guide the labour market in judging the quality of the graduates.

The document focuses on benchmarking in terms of the output rather than the process. This means focusing more on Expected Learning Outcomes (ELOs) rather than the details of the content of the Programme. The outcomes or competence approach was chosen because of the need to harmonize the medical training programmes in Tanzania, and to match with the rest of the world, where medical education for a long time has been outcomes or competency based. The

[6] Inter-University Council for East Africa – Benchmarks for The Bachelor of Computer Science and the Bachelor of Information Technology Programmes. IUCEA, 2015.

process of ensuring commensurate content, pedagogy, and assessment to achieve the ELOs is left to the individual Health Sciences Universities and Colleges to determine.

1.2 Justification

Since its establishment, TCU initiated a reform process to reposition itself to address its mandate within the country. Such reforms became necessary and urgent by enacting the Universities Act No. 7 of 2005.[1] The reforms prompted the need to establish an appropriate environment for the harmonization of higher education systems. Among the important steps towards harmonization of higher education in Tanzania was the setting up the Universities Quality Assurance systems, namely the Universities Qualifications Framework (UQF) of 2012 [7] and Quality Assurance – General Guidelines and Minimum Standards for Provision of University Education in Tanzania in 2014.[8]

In retrospect, the IUCEA, through its efforts to harmonize QA in higher education in the region, developed a Quality Assurance Handbook - the 'Road Map to Quality (2010) in four Volumes, which is a guide towards developing QA systems and culture in universities in East African Partner States.[9] In light of the above, it was deemed necessary to develop the undergraduate medical doctor (MD/MBBS/MBChB) degree benchmarks that the Health Science University institutions in Tanzania should use to benchmark development and review of their programmes. Based on the available knowledge and skills of the benchmarks developed by IUCEA, TCU decided to create the MD/MBBS/MBChB programme benchmarks based on learning outcomes. These benchmarks are needed because learning outcomes should guarantee: -

(i) Comparable quality levels of the medical graduates,
(ii) Comparable chances for the medical graduates in the labour market.

---

[1] URT (2005). The Universities Act No 7, 2005. Dar es Salaam MHEST, 2005 (Section 5(1) (f),
[7] Tanzania Commission for Universities (TCU). University Qualifications Framework (UQF). First Edition. Dar-es-Salaam (2012).
[8] Tanzania Commission for Universities (TCU). Quality Assurance – General Guidelines and Minimum Standards, 2014.
[9] The Inter-University Council for East Africa (IUCEA). (2010). A *Road map to Quality. Handbook for Quality Assurance in Higher Education*

(iii) The labour market understands the competencies that medical graduates possess.
(iv) Increased national and international mobility of students and academic staff.

1.3 The development process

The development of the benchmarks for the MD/MBBS/MBChB programmes underwent an interactive process that included data collection, analysis, and documentation. A consultative meeting was then held in February 2019, bringing together all health sciences stakeholders in a preparatory meeting and round table sessions to deliberate on the content of the benchmarks as follows: -

(i) The First Stakeholders' Engagement Meeting: 21-22 February 2019

The First Stakeholders' Engagement Meeting was conducted at MUHAS from 21st to 22nd February 2019. The meeting was organized by the consortium of the Transforming Health Education Professions Education in Tanzania (THET) project, which is a MUHAS, KCMUCo and CUHAS consortium funded by the Fogarty International Centre (FIC) of the National Institute of Health (NIH), USA. The THET consortium organized the first stakeholders meeting to inform all stakeholders about the curricula transformation process and harmonized health profession programmes in Tanzania. This was partly driven by the call from the society and stakeholders after noting differing competencies among health professionals graduating from different University institutions in Tanzania.

The participants were stakeholders from all health professions university academic institutions in the country, professional bodies, employers, TCU, IUCEA, National Institute for Medical Research (NIMR) and Health Professional Councils, the Teaching Hospitals, the students' Governments from MUHAS, CUHAS and KCMUCo, the Ministry of Education Science and Technology (MoEST), the Ministry of Health, Community Development, Gender the Elderly and Children (MoHCDGEC), Christian Social Services Commission, the Association of Private Health Practitioners in Tanzania (APHTA), the Tanganyika Law Society (TLS), the University of California at San Francisco (USA), and Duke University (USA).

The first meeting agreed and accepted the need to have harmonized programmes for health professions, starting with the MD/MBBS and BScN programmes as the benchmarks for other health professions programmes. To make sure the efforts are sustained, the stakeholders and particularly the Health Science Colleges and universities agreed to collectively work together to develop pedagogy skills to academic staff, to enable them to implement the developed harmonized competency-based programmes.

(ii) Stakeholders Workshops on Curriculum Development, 24th July 2019.

The 2nd Stakeholders meeting was held at MUHAS on 24th July 2019 and developed benchmarks for MD)/MBBS/MBChB in line with the University Qualifications Framework (UQF) harmonization of the programmes in the country. Specifically, the objective of the 2nd stakeholders meeting was to receive ideas from stakeholders regarding the basic minimum competency requirements and learning outcomes medical graduates should have upon graduation from all medical schools/faculties in the country through harmonization of curricula. The meeting also aimed at receiving guidance, thoughts, ideas on medical schools'/faculties minimum skills requirements that will be developed and included in the harmonized programmes to be used as benchmarks for all other health professions programmes in the country.

The meeting was attended by stakeholders from all Health professions Universities and Colleges in Tanzania, the TCU, MoEST, MoHCDGEC, Tanzania Medical Devices and Drug Authority (TMDA), Medical Council of Tanganyika (MCT), Tanzania Nursing and Midwifery Council (TNMC), Pharmacy Council of Tanzania (PCT), Teaching Hospitals, among other stakeholders. During the second meeting, and to be more efficient, the participants were divided into nine groups. Each group was given time to discuss the nine areas that constituted the nine (9) Competency Domains for MD/MBBS and BScN programmes. These domains were developed by faculty from the THET project partner institutions, namely MUHAS, KCMUCo and CUHAS, in a curricula-mapping workshop that was conducted a week before the stakeholders' engagement workshop. In the end, the stakeholders meeting refined and agreed on the Nine Domains of Competency for the MD/MBBS programme and the

sub-competencies as the Graduate Minimum Essential (GRE) requirements. The agreed Competency Domains are: -

(i) Professional Knowledge
(ii) Practical/Clinical Skills
(iii) Relationships with Patients, Clients and Communities.
(iv) Communication Skills.
(v) Intra and inter-professional practice and collaboration.
(vi) Maintaining Good Practice.
(vii) Working within the System and Context of Health.
(viii) Professionalism.
(ix) Scientific Inquiry and critical thinking (Problem Solving).

Therefore, the output of the second stakeholders' workshop for MD/MBBS/MBChB programme was an initial draft skeleton with programme goal, objectives, expected programme learning outcomes, Competency Domains, and sub-competencies. The workshop resolved that under the guidance of the three THET institutions' experts and curricula development groups, the institutions should continue developing a draft generic curriculum before the next stakeholders meeting.

(iii) Stakeholders' Meeting for Curriculum Development, 4th March 2020

The third Stakeholders meeting was held on 4th March 2020 at MUHAS. The meeting aimed to receive the draft generic harmonized MD/MBBS/MBChB programme and get inputs and additional suggestions from stakeholders. Participants were from the three THET collaborating institutions, one participant from UCSF, all other health professions training institutions currently running MD and MBBS programmes, higher education regulatory authorities, and health sciences professional councils. During that meeting, stakeholders discussed and gave inputs to the draft generic harmonized curricula for the MD/MBBS/MBChB programme. This process was guided by the gap analysis and curricula mapping whereby, the meeting refined the benchmarks draft with the programme content areas and descriptions, courses and modules, fieldwork, and elective period benchmarks were refined.

At the end of the 3rd stakeholders' meeting, the stakeholders had a clear structure of how the MD/MBBS/MBChB programme benchmarks will

be like and resolved to allow the THET group and their curricula committees to finalize the harmonized programme benchmarks. The stakeholders who participated in the development process commended the THET consortium institutions for this initiative. They were confident with the eventual outcomes because the development process adhered to the basic principles of designing and developing curricula. Stakeholders emphasized the need for these programmes to be the benchmarks for all other health professions programmes in the country.

After the meeting, the THET group and curricula development experts finalized the harmonized generic Programme for MD/MBBS/MBChB. Also, each consortium institution used the harmonized generic programme to develop institutional programmes ready for approval and accreditation. All other health professions institutions will use the generic MD/MBBS/MBChB programme as benchmarks for developing first-degree medical programmes in Tanzania.

(iv) Final Stakeholders Meeting for deliberating on the Benchmarks

The third and final stakeholders meeting was convened at the LAPF International Conference Centre - Dar es Salaam, on 30th September 2021. The objective of the meeting, which was jointly facilitated by the THET Consortium and TCU, was to deliberate on the draft Bachelor Degree Programme benchmarks for Doctor of Medicine and Bachelor of Science in Nursing. After receiving the draft benchmarks from the working group, the meeting participants discussed the benchmarks in groups, identified areas that needed further improvements and presented their groups' suggestions in a plenary discussion. The plenary discussion format was designed to make sure each suggestion, addition or alteration was in line with the principles of benchmarks development and important to guide universities in programmes review or development.

The meeting was attended by stakeholders from the THET Consortium, representatives from Health professions University Institutions in Tanzania mainland and Zanzibar, Representatives from TCU, Medical

Council of Tanganyika (MCT), Zanzibar Medical Council (ZMC), Tanzania Nursing and Midwifery Council (TNMC), and Zanzibar Nursing and Midwifery Council (ZNMC),

After a whole day's meeting, the stakeholders adopted the benchmarks and agreed on the final inputs, corrections and refinements and requested the benchmarks working group to refine and produce the final version.

PART 2: THE BENCHMARKS AND QUALIFICATIONS FRAMEWORK

2.1 The Qualifications Framework

The MD/MBBS/MBChB programme benchmarks in this document provide a national standard for programmes learning outcomes. Development of the benchmarks has ensured that they are in line with the TCU University Qualifications Framework (UQF) of 2012. The UQF, which defines higher education levels from level 6 to 10, where the MD/MBBS/MBChB programme belongs, is an outcome-based framework. Each level has a descriptor that sets in broad generic terms the associated outcomes. However, the benchmarks document will not replace the UQF but rather complement it as a tool to translate the framework into practical terms. In the UQF, the undergraduate medical programmes are at level 8 for bachelor's degrees.

From the level 8 descriptor of the UQF, the holder of MD/MBBS/MBChB degree should be able to apply knowledge, skills, and attitudes in a comprehensive 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. The latter circumstances must include those within the medical and health sector in general and those beyond the health sector but have consequences on the healthy well-being of the society.

2.2 Curriculum design

The purpose of the MD/MBBS/MBChB benchmarks is to support Universities and Colleges of Health Sciences to develop or review the MD/MBBS/MB ChB degrees programmes in Tanzania. When designing the MD/MBBS/MBChB programme, one should use at the minimum the generic descriptors—indicated in the UQF but in line with the requirements of the medical profession. Also, institutions should consider the dynamic nature of technology and advances in science in developing their MD/MBBS/MBChB programmes. The latter will require the production of competent graduates who can respond to the rapidly ever-changing health demands. The graduates should be able to manage specific medical and other health-related problems within their context and provide broader solutions to threats that may affect health but originate from other multilateral sectors. This, therefore, calls for

the MD/MBBS/MBChB programmes to be Outcome-Based Education (OBE) programmes.

Further, while addressing the context-specific needs, the programmes must be geared to generate competent graduates who meet the global standards set by international authorities in medical and health sciences. Ensuring that the preceding is achieved, the MD/MBBS/MBChB curriculum should be organized at a minimum of nine (9) competency domains. These are: -

(i) Professional Knowledge.
(ii) Practical/Clinical Skills.
(iii) Relationships with Patients, Clients and Communities.
(iv) Communication Skills.
(v) Intra and inter-professional practice and collaboration.
(vi) Maintaining Good Practice.
(vii) Working within the System and Context of Health.
(viii) Professionalism.
(ix) Scientific Inquiry and critical thinking (Problem Solving).

These competency domains should then be translated into learning outcomes that target the three levels of the learning curve of cognitive, psychomotor, and affective domains at the Programme, course, module, and topic levels, as will be detailed in the proceeding sections.

2.2.1 Programme objectives

Programme objectives are broad statements that describe the career and professional accomplishments that the Programme is preparing graduates to achieve. Therefore, the MD/MBBS/MBChB programme should be designed to address the concerns of different stakeholders, from students to employers. This fact should be reflected in the programme objectives. The objectives of the undergraduate medical degree (MD/MBBS/MBChB) programme can be grouped to address three broad areas: -

(i) Academic ability of the graduates.
(ii) Employability of the graduates.
(iii) Personal development in the profession.

Before 2011 Health Science University institutions in Tanzania had well-articulated programme objectives. Still, none had well-set programme outcomes, and most did not define the difference between

"programme objectives" and "programme outcomes". Programme outcomes are the knowledge, skills, and attitudes (attributes) the graduate of a medical degree programme should have. Programme objectives deal with the general aspect of graduation for a particular programme and the competencies and expertise a graduate will possess after completion of the programme. These are usually broad and cover a wider area than course outcomes. [10]

In 2011/12, MUHAS transformed its academic programmes, and through the involvement of educational experts, programme objectives and programme outcomes were defined. The MD/MBBS/MBChB programme objectives and outcomes should therefore be translated into Student Learning Outcomes (SLO's), i.e., what students should *know, do, or value* after completing the programme. Therefore, the programme objectives should prepare medical students with the knowledge, skills, attitudes, and behaviours appropriate and necessary for performance and empathy in their medical careers. The objectives are defined by the core competencies of the graduates grouped in the nine (9) domains of Competency or Core Competencies mentioned earlier.

2.2.2 Formulating the Expected Learning Outcomes (ELOs)

After defining the programme objectives and competency domains, the next step in designing or redesigning the medical doctors (MD/MBBS/MBChB) Programme is developing the Expected Learning Outcomes (ELOs). The ELOs describe clearly what the learner is expected to demonstrate after completing the whole programme (Programme Learning Outcomes – PLOs), course (Course Learning Outcomes – CLOs), Module (Module Learning Outcomes -MLOs) or even a topic. In other words, the LOs can be at the level of the programme, course, module, unit, or a topic in the programme and even a lecture[11],[12],[13]. Medical training Universities and Colleges are expected to compare their formulated LOs with these MD/MBBS/MBChB benchmarks and see what is missing or need to be rephrased during

[10] Harden RM: Learning outcomes and instructional objectives: is there a difference? Medical Teacher, 24, (2), 2002, 151–155.

[11] Noghabaei G, Arab M, Ghavami B, Hosseini-Zijoud S-M: Expected learning outcomes of medical school graduates. Journal of Advances in Medical Education (JAMED) 3, 2016.

[12] Thorsson I: Formulating Learning Outcomes. Karolinska Institute, 2007.

[13] Kennedy D, Hyland A, Ryan N: Writing Learning outcomes: A practical Guide. Implementing Bologna, 1-115, 2007.

programmes development and review. For the LOs, the institutions should describe how the outcome will be ***measured and assessed***. The undergraduate medical doctors' programme benchmarks are based on the formulated learning outcomes.

Broadly, learning outcomes are defined as statements of what a learner *knows, values and can do* on completing a learning process and grouped in terms of *knowledge, skills, and attitudes*. Competence or Competency is the proven ability to use knowledge, skills, personal, social, and methodological skills in work or study situations, and professional and personal development. [11,12,13] A graduate exhibiting competence at the workplace will have partly acquired the competencies as outcomes of his/her study. It should be noted that some of the competencies are developed through non-formal and informal experiences, and others are inborn. This means that not all competencies are taught at Colleges and Universities. The learning outcomes constitute only a part of the competencies a graduate will show in his/her job.

It has been observed that although Medical Schools/Faculties defines objectives and measure outcomes for the medical doctors' programmes in one form or another, many do not approach the process of formulating LOs in a uniform and systematic way. It is important to note that focusing on and defining LOs[14] for the undergraduate medical degree programmes would create an opportunity to: -

(i) Enhance medical students' learning and mobility.
(ii) Provide guidance to lecturers and instructors.
(iii) Identify and overcome barriers to effective teaching.
(iv) Facilitate collaboration among medical schools in the country, the region and beyond.
(v) Improve medical students' learning, retention, and completion.
(vi) Produce quality medical graduates; and
(vii) Increase medical graduates' chances for employability.

Therefore, in these benchmarks, LOs for the undergraduate medical degree programmes (MD/MBBS/MBChB) are defined as what a medical student is expected to know, do, and value after a learning experience and *how well* the student should be expected to achieve those **outcomes.** LOs state both the *substance of learning* and *how its attainment is to be demonstrated.* LOs can be re-organized in three domains of teaching and learning hierarchy: -

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

In Bloom's taxonomy, [14], the teaching and learning hierarchy is essential for the correct and consistent building of the knowledge side of the LOs. The cognitive domain comprises six levels starting with the lowest level, **remembering,** and ending at the top, **creating** the most complex taxonomy level (**Figure 1)**. Thus, when formulating the **ELO's**, one must use *Action Verbs*, starting at the lowest level of the taxonomy upwards **(Figure 2).**

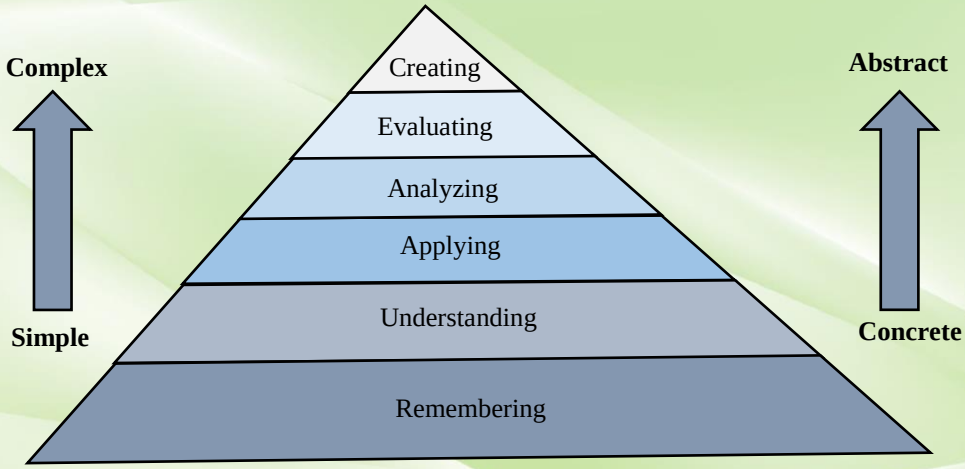


Figure 1: Revised Taxonomy of Bloom (Anderson and Krathwohl 2001)[15]

[14] Bloom BS, Engelhart MD, Furst EJ, Hill W h, & Krathwohl DR: Taxonomy of educational objectives: the classification of educational goals; Handbook I: Cognitive Domain New York, Longmans, Green, 1956.
[15] Anderson LW, Krathwohl DR, Airasian PW, Cruikshank KA, Mayer RE, Pintrich PR, Raths J, & Wittrock MC: A taxonomy for learning and teaching and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition). New York: Longman, 2001

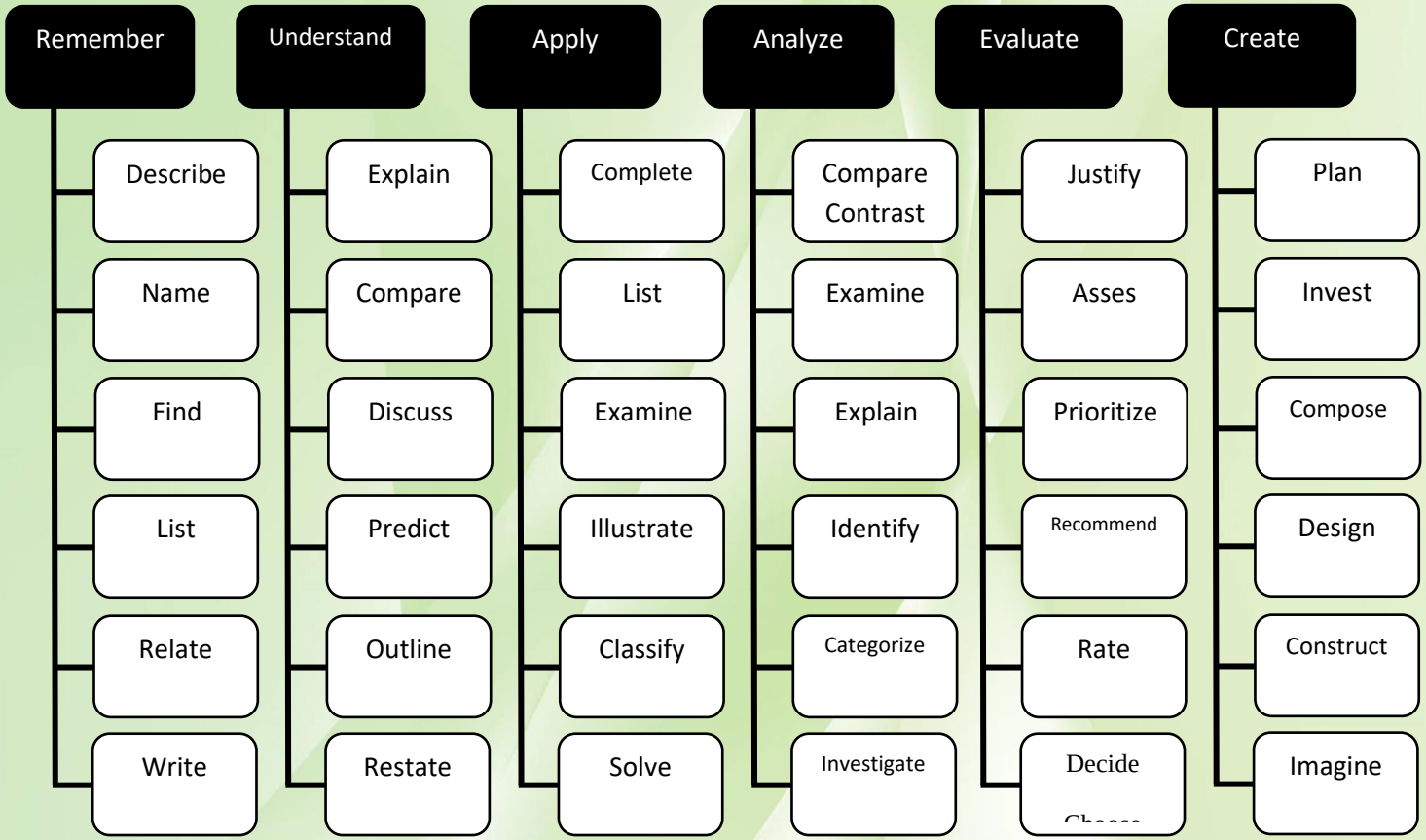


Figure 2: Action words for the cognitive domain (Anderson and Krathwohl 2001)[16]

2.2.3 Translating learning outcomes into the Programme

After formulating the LO's, the next step for medical doctors' curricula developers is to identify the relevant courses required to achieve the learning outcomes. These will include the core courses or subjects, optional courses, or subjects as applicable, and a clear distinction between the two. The core courses should typically not be less than 80% of the curriculum. In either case, the LO's to be achieved must be stipulated in the medical curriculum. Developers should also establish which new courses should be added in addition to what exists in the current programme; or which existing courses or subjects should be replaced. Each planned course shall have **course, module, and topic** learning outcomes aligned to the medical programme Learning Objective and Learning Outcomes (LOs). The courses, modules and topics should indicate how and when each learning outcome will be attained.

The alignment matrix should detail the formulated CLOs for each course. This will help to determine how the course contributes to the PLOs and determine the MLOs and how the module contributes to the CLOs. There should be clear evidence that the work students are doing in one or more classes directly supports student achievement of the intended learning outcomes for the programme. The alignment of programme learning outcomes and curricula is critical. If statements of student learning outcomes are adopted but are not addressed in the curricula, the outcomes assessment process will be worthless. To ensure that the planned courses cover all the learning outcomes, the programme developers should design a curriculum alignment matrix as shown in **Table 1.**

Table 1: An Example of Curriculum alignment matrix for MD/MBBs/MBChB programme

Learning outcome	Course 1	Course 2	Course 3	Course 4	Course 5
Communication skills	x				X
Critical thinking and Scientific Inquiry			x	X	
Interprofessional collaboration		X			
Working within systems					
Professional knowledge	X		X		
Professionalism				X	x

2.2.4 Course description

The LO's for the undergraduate medical degree (MD/MBBS/MBChB) programmes are provided in these benchmarks. Universities and Medical Schools should develop the programme courses starting with formulations of the LO's for the specific course, referred to as the backward design of a curriculum. Each course in the programme should have a clear description. The Programme should assess whether students are achieving the learning outcomes. To ensure this, decision on how each learning outcome is assessed must be included in the courses and modules description. An example of a course description is shown in **Appendix 2**.

2.3 Quality Assurance (QA)

The benchmarks provide critical milestones for developing and harmonizing the undergraduate medical degree (MD/MBBS/MBChB) programme. This is an essential step for ensuring that all medical graduates in the country are trained and provided with the same level of learning and have achieved comparable learning outcomes and competence. Although each higher learning university institution may have its criteria for formulating outcomes and assessing the quality of the medical training programme, the benchmarks will play a pivotal role in harmonizing assessment and QA of the medical degree in the country. TCU and MCT will align their standards with these benchmarks. For Health Sciences Universities, Colleges and Medical Schools/Faculties in the country, the benchmarks provide a good tool for evaluating their medical students' training programmes.

2.4 Implementation of the Benchmarks

The MD/MBBS/MBChB benchmarks will be implemented by the higher learning institutions offering the programmes under the oversight of TCU. The Programmes design into courses, modules, or unit systems lies with the authority of the higher learning institutions without distorting the **competency domains**, **the competencies and learning outcomes** described in the benchmarks. TCU will provide the overall oversight, coordination, and evaluation of benchmarks implementation.

2.5 Review of the Benchmarks

The medical undergraduate degree benchmarks shall be reviewed every seven (7) years to include new technological advancements in the medical profession, market requirements and emerging priorities.

PART 3: BENCHMARKS FOR UNDERGRADUATE MEDICAL PROGRAMMES

3.1 Description of Undergraduate Medical (MD/MBBS/MBChB) Programme.

The undergraduate medical programme has two goals – (i) to provide an academic education in the basic and clinical sciences, and (ii) to prepare graduates for professional practice as doctors. The programme provides the graduate with intellectual skills such as critical and analytical thinking, reflection, problem-solving and clinical reasoning, and other soft skills such as professionalism, communication, leadership, and teamwork.

The programme should be designed to include a minimum of essential core competencies required for the graduate to have achieved after completion of training. The programme is principally concerned with intended student learning outcomes (outputs) instead of what students are taught (inputs). The Programme must accordingly be guided by five basic premises that underpin Competency-Based Education (CBE). First is, the Intended Learning Outcomes (ILOs) are clear, are in all three domains of learning, i.e., knowledge (K), skills (S) and attitudes (A). The second is that the learning outcomes inform the programme designers and directly align with *learning activities* and *assessment methods*. Thirdly, the programme is designed to stimulate students to engage deeply in learning activities by establishing high challenging standards of performance. Fourthly, the curriculum is structured in a spiral manner so that learning is from *simple to complex* levels, as shown in **Figure 3**. Fifthly, the programme gives appropriate opportunities for all students to overcome the learning rate and style differences and achieve mastery of competencies.

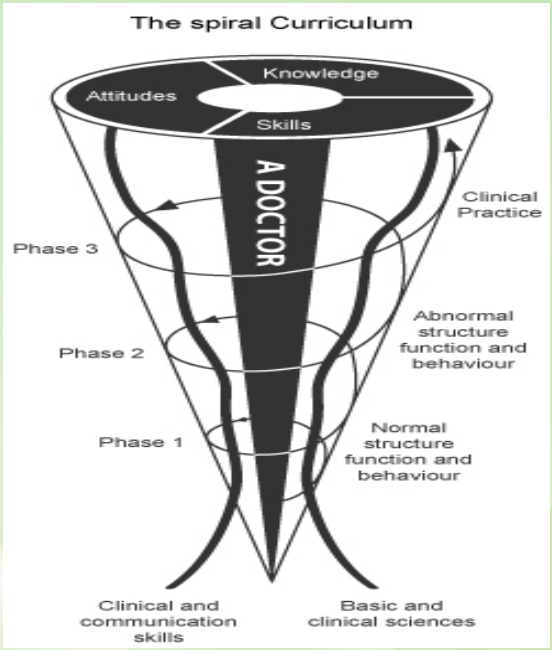


Figure 3: Spiral Medical Programme Conceptual Model [16.]

Spiral curriculum, a concept attributed to Jerome Bruner, refers to a curriculum design in which key concepts are presented repeatedly throughout the curriculum and deepening layers of complexity or in different applications. The benefits of this type of curriculum are:

(i) Information is reinforced and made solid each time the student revisits the topic or subject.
(ii) Allows logical progression from simple to complicated ideas.
(iii) Allows learners to apply early knowledge to later course learning outcomes.

3.2 Programme goals

The MD/MBBS/MBChB programme should aspire to prepare graduates who are: -

(i) Clinically competent and prepared for life-long learning throughout the phases of their career.
(ii) Ethical decision-makers dedicated to acting in accordance with the highest standards of professionalism.
(iii) Adaptive in response to the needs of patients and communities from diverse and varied populations.

[16] Bruner J: The process of Education. Cambridge, MA: The President and Fellows of Harvard College, 1960.

(iv) Engaged in integrated, team-based care in which patient needs are addressed in an equitable, individualized, and holistic manner.
(v) Reflective and able to act in the face of novelty, ambiguity, and complexity.
(vi) Resilient and mindful of their well-being and that of their colleagues.
(vii) Able to make the most of technological advances to optimize their learning and optimize care delivery to their patients.
(viii) Capable of and committed to evidence-informed practices and scholarship and a culture of continuous performance improvement.

3.3 Programme objectives (Programme Learning Outcomes – PLOs)

The undergraduate medical degree (MD/MBBS/MB ChB) programme should be designed to address the concerns and needs of different players in health and health-related fields, including students/graduates and employers. This will be achieved through grouped programme objectives as follows: -

3.3.1 Academic ability

The MD/MBBS/MBChB programme objectives should equip learners with: -

(i) Knowledge, skills, and behaviours appropriate and necessary for addressing medical problems.
(ii) Knowledge skills and attitude for practicing medicine at the highest standards, serving all individuals and societies to pursue health.
(iii) Knowledge and ability to practice independently, including in rural health facilities.
(iv) Ability to work in teams for interprofessional collaborative practice to solve health issues.
(v) Ability to practice the science of medicine by creating new knowledge for improving health locally, nationally, regionally, and globally.
(vi) Knowledge and the ability for practicing ethically, emphatically and adherence to legal provisions.
(vii) Knowledge and ability to put the patient healthcare needs first in every situation.

(viii) Ability to conduct medical research to inform medical practice and policy.

3.3.2 Employability

Medical Education in the 21st century should produce doctors who can respond to changing epidemiological profiles, health systems challenges and population health needs. Medical programmes should, therefore, ensure that their graduates are fit for practice and fit for purpose. The undergraduate medical programme objectives are to equip learners with: -

(i) Current medical practice skills for the different health facilities in Tanzania.
(ii) Ability to intergrade medical knowledge and practice to perform effectively and efficiently in medical and other health facilities.
(iii) Skills for solving medical and health-related problems for patients and the community.
(iv) Analytical skills to understand the outcomes of medical practice to individuals, the community, and the country.
(v) Knowledge and skills that allow medical creativity, innovativeness, and entrepreneurship in medical practice.

3.3.3 Trainee personal development

The rapid advancements in health sciences and technologies require well-qualified graduates with appropriate knowledge and skills to fulfil the ever-changing professional work requirements. Continuing Professional Development (CPD) allows systematic acquisition, maintenance of knowledge and skills necessary for medical doctors to execute their duties effectively in line with the advancement of health sciences. Therefore, the undergraduate medical programme objectives are to: -

(i) Prepare learners for continuous improvement, self-evaluation, and life-long learning.
(ii) Prepare learners to advance and make progression in their career.
(iii) Equip learners with a professional attitude, ethics, and values.
(iv) Prepare learners to develop cultural sensitivity, skills, and attitudes for working in international environments.
(v) Prepare learners with knowledge and skills to allow them to work in medical and other health professional teams.

(vi) Equip learners with knowledge and skills to improve results and knowledge and skills-seeking behaviours and encourage these behaviours in others.

3.4 Expected Competencies and Learning Outcomes (ELOs)

In harmonizing medical Education in Tanzania, ELOs described below were formulated as benchmarks for all medical schools and Colleges. The undergraduate medical (MD/MBBS/MB ChB) programme should have at least nine Broad Competency Domains, which include Knowledge; Clinical/practical skills; Communication skills; Relationships with Patients, Clients and Communities; Intra and inter-professional practice and collaboration; Maintaining Good Practice; Working within the System and Context of Health Care; Professionalism, and Scientific Inquiry & Critical thinking.

Each of these broad competency domains should have a minimum of three (3) and a maximum of nine (9) LOs, also called sub-competencies or enabling competencies. The LOs should be written using action verbs [12,17,] associated with higher-order learning of the revised Bloom's taxonomy [16] levels to promote learners critical thinking skills, as shown in **Figure 4**. The ELOs described for the undergraduate medical degree programme are the threshold which all graduates must achieve.

[12] Thorsson I: Formulating Learning Outcomes. Karolinska Institute, 2007.
[16] Anderson LW, Krathwohl DR, Airasian PW, Cruikshank KA, Mayer RE, Pintrich PR, Raths J, & Wittrock MC: A taxonomy for learning and teaching and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition). New York: Longman, 2001
[18] Hoque EM: Three Domains of Learning: Cognitive, Affective and Psychomotor. JEFLER, 2: 45-52, 2017.

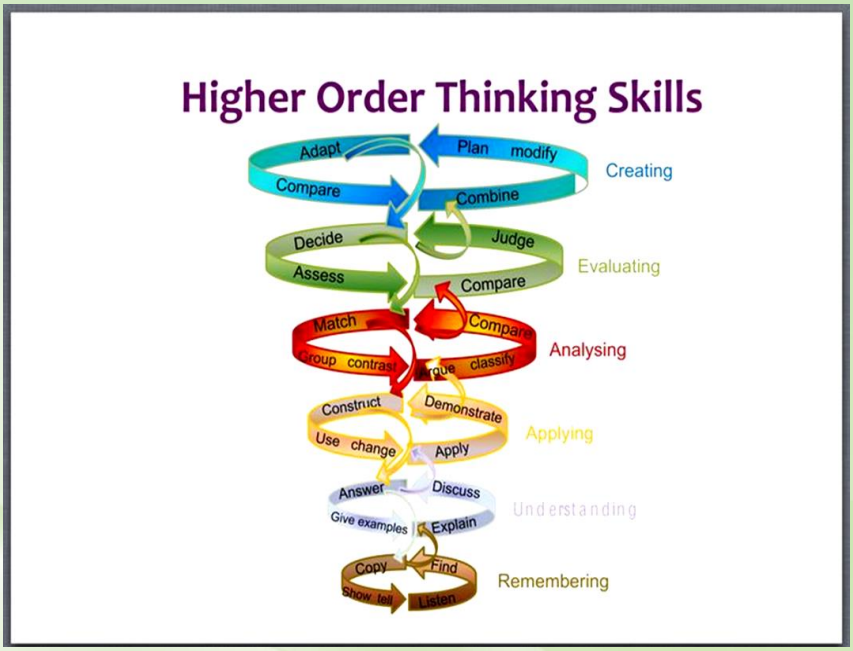


Figure 4. Revised Blooms Taxonomy[16]

In addition, programmes should ensure that the LOs are developed for all three domains of learning, namely Knowledge (K), Skills (S) and Attitudes (A) required for medical practice. Each LO should be aligned with teaching/learning methods and assessment strategy/criteria. **Table 2** outlines examples of ELOs for the undergraduate medical degree (MD/MBBS/MB ChB) in Tanzania. The minimum ELOs list is attached as **Appendix 1**

Table 2: <u>Examples</u> of Competency Domains, Domains of Learning, and Expected Learning Outcomes, aligned with Teaching/Learning Activities and Assessment Criteria.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
1.0	**Professional Knowledge**	**Knowledge**	1. Demonstrate knowledge of factors and mechanisms of disease conditions	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, fieldwork, lectures, ward rounds, role play, role modelling, demonstration	Knowledge of the pathophysiology of communicable, and non-communicable diseases and management of clients with such conditions employed correctly.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
		Skills	2. Apply critical reasoning to solve health care challenges	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, fieldwork, ward rounds, role play, role modelling, demonstrations	Critical reasoning applied effectively in solving of health care challenges.
		Attitudes	3. Reflect upon personal strengths and limitations and actively work to correct deficiencies, seeking assistance when needed	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, lectures, ward rounds, role play, role modelling and demonstration	Accepts constructive feedback, consult, correct errors, and learn from them.
2.0	**Practical/Clinical Skill**	**Knowledge**	4. Demonstrate knowledge of appropriate techniques for conducting complete and relevant clinical evaluation in a systematic manner	Seminars, clinical teaching sessions, video demonstrations, role modelling, ward rounds and lectures	Techniques for appropriately conducting complete and relevant history and physical examination and synthesize the information into a differential diagnosis correctly described.
		Skills	5. Use medical instruments and equipment	Seminars, clinical teaching sessions, practical demonstrations, video demonstrations, role modelling, and ward rounds	Performs the basic medical and surgical procedures
		Attitudes	6. Demonstrate compassion and care towards patients regardless of differences in beliefs, identity, race, and culture	Seminars, clinical teaching sessions, video demonstrations, role play and role modelling.	Compassionate care regardless of beliefs, identity, race, and cultural differences appropriately demonstrated.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
3.0	**Relationships with Patients, Clients and Communities**	**Knowledge**	7. Demonstrate knowledge of methods of communication	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling	Evaluates methods to use when communicating with different groups with different behaviours and or background to avoid stigmatization
		Skills	8. Establish constructive relationships with patients, clients, and communities	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling	Uses communication techniques and tools effectively in facilitating discussions and interactions that enhance establishing therapeutic relationships with Patients, Clients and Communities
		Attitudes	9. Demonstrate respect for clients' views and understanding of healthcare-related issues and information	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling	Acts with honesty and integrity to develop trusting relationships with patients, families, and community
4.0	**Intra and inter-professional practice and collaboration**	**Knowledge**	10. Demonstrate knowledge of one's role and those of other health professions to assess and address the health care needs of patients appropriately	Seminars, Case presentations, fieldwork, lectures, ward rounds, role play, role modelling	Applies health care team dynamics principles to deliver and evaluate patient/population-centred care appropriately.
		Skills	11. Demonstrate ability to build teams working under a broad range of personal and practical circumstances.	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling,	Works efficiently with other health professionals in respectful and responsible manner that supports a team approach under varying personal and practical situations.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
		Attitudes	12. Maintain effective working relationships with other health professionals, peers, and faculty	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling, demonstration	Demonstrates respect for unique cultural values, roles, responsibilities, and expertise of own and other health professions, peers, and faculty appropriately.
5.0	**Communication skills**	**Knowledge**	13. Demonstrates the ability to communicate with a patient/client.	Seminars, Case presentations, fieldwork, ward rounds, role play, role modelling, demonstrations	Provides information to the patient (oral, written, electronic and over the phone) in a timely, comprehensive, and meaningful manner.
		Skills	14. Use appropriate patient/client counselling and educational techniques	Case presentations, fieldwork, ward rounds, role play, role modelling, demonstrations	Counsels and educate clients and patients using appropriate counselling principles and techniques effectively.
		Attitudes	15. Demonstrates awareness of the verbal and non-verbal communication of both the patient and the healthcare professionals (e.g., eye contact, gestures, facial expressions, posture) and responds to them appropriately.	Seminars, Case presentations, fieldwork, lectures, ward rounds, role play, role modelling, demonstration	Listens and responds to patients and other health professionals verbal and non-verbal communication empathetically and effectively.
6.0	**Maintaining Good Practice**	**Knowledge**	16. Analyze evidence from scientific studies, guidelines and protocols related to clinical practice.	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, fieldwork, ward rounds, role play, role modelling.	Seeks information necessary to improve professional practice (life-long learning) regularly.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
			17. Demonstrate the ability to evaluate, integrate, and apply appropriate information from various sources to create cohesive, persuasive arguments and propose and design concepts.	Journal clubs, research project lectures, ward rounds, assignments, fieldwork	Develop meaningful scientific questions and generate testable scientific hypothesis
		Skills	18. Demonstrate the ability to apply basic research methods for health and health-related issues, including research design, data analysis, and interpretation.	Journal clubs, research project, ward rounds, assignments, fieldwork	Designs and conducts a scientifically sound research project and appropriately apply the results to correctly solve health issues.
			19. Use scientific evidence in providing health care services	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, fieldwork lectures, ward rounds, role play, role modelling, demonstration	Employs evidence-based decision-making correctly to provide care.
		Attitudes	20. Demonstrate ability to assess own skills and limitations.	Seminars, case studies, clinical presentations, role modelling, ward rounds.	Individual abilities and limitations are recognized correctly, and consultations are made appropriately.
7.0	**Working within the System and Context of Health Care**	**Knowledge**	21. Demonstrate knowledge of how the healthcare system functions (structures, policies, regulations, standards, and guidelines)	Lectures, seminars practical, group and individual assignments, and projects.	Healthcare system functions (structures, policies, regulations, standards, and guidelines) are described correctly.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
		Skills	22. Uses appropriate health care resources for optimization of patient care.	Seminars practical, groups and individual assignments, fieldwork, and role modelling.	Healthcare resources and consideration of cost and risk benefits to patients' care applied appropriately.
		Attitudes	23. Advocates for quality and optimal patient care systems.	Seminars practical, group and individual assignment, ward rounds, and role modelling.	Identifies system errors and in implements potential systems solutions accurately and timely.
8.0	**Professionalism**	**Knowledge**	24. Demonstrate knowledge on principles of health care professionalism	Lecture, Seminars practical, group and individual assignment, and research project,	Describes the pillars of health care professionalism correctly.
		Skills	25. Demonstrate time manage skills and an appropriate level of preparedness	Practical, clinicals, group and individual assignments and discussions, role playa and role modelling.	Observes punctuality and prepares appropriately for all assignments and daily tasks.
		Skills	26. Demonstrate respect for everyone during the rotations, including site employees, patients/families, and the public.	Practical, clinical/community rotations, group and individual assignment, role play, role modelling.	Works with other professionals, patients, other caregivers, and the community as teams to ensure provision of optimum care.
		Attitudes	25. Demonstrates accountability for errors conducted during provision of health care services	Self-directed reading, seminars, video demonstrations, clinical rounds, role play and role modelling.	Admits to errors and refrains from allocating blames and seeks for solutions and assistance to rectify errors correctly and timely.

S/N	General Competency Domain	KSA Domain	Expected learning outcomes	Teaching/Learning Activities	Assessment Criteria
9.0	**Scientific Inquiry and Critical thinking**	**Knowledge**	28. Demonstrate an increased ability to explain a health problem comprehensively.	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, role play, role modelling, demonstrations.	Explains comprehensively and accurately the causes of and solutions to health problems.
		Skills	29. Employ evidence/information in conducting a comprehensive analysis to solve health care challenges	Presentations, bedside teaching, seminars, Case presentations, fieldwork, ward rounds, role play, role modelling, demonstrations.	Applies evidence from data in accurately analysing and solving health problems.
		Attitudes	30. Demonstrate ability to describe his/her perspectives along with those of others in solving health problems.	Journal clubs, clinical presentations, bedside teaching, seminars, Case presentations, ward rounds, role play, role modelling and demonstration.	Accepts constructive feedback and willingness to correct and learn from errors positively.

3.5 Translating the Competencies and LOs into the MD/MBBS/MBChB Programme

(a) Programme structure

The MD/MBBS/MBChB degree programme is defined as a bachelor level eight (8), based on the UQF. In translating the LOs into the programme in these benchmarks, that aspect has been considered. Programme developers or reviewers should ensure the MD/MBBS/MBChB programme consist of several courses leading to a degree. The first two years or the pre-clinical phase of the programme should be dedicated to biomedical science courses, necessary for facilitating a deep understanding of the subsequent clinical-stage courses and rotations during years three to five. The MD/MBBS/MBChB programme structure should be organized into courses that may have modules during the first three years and clinical rotations during years three to five, but each rotation should cover a specific course or subject.[13] The most important aspect of programme course structuring should be that the courses are arranged from simple to complex in a

spiral fashion and tabulated in a normal learning matrix. In the case of the MD/MBBS/MBChB programme the simplest courses are the biomedical sciences which are prerequisite before students can proceed to the more advanced clinical courses. An example of minimum programme structure and courses of the MD/MBBS/MBChB programme (Normal Learning Matrix) is shown in **Appendix 3.**

(b) Methods of Delivery

The programme can be delivered in many ways guided by the learning outcomes. However, irrespective of the approach, a significant amount of time should be dedicated to active learning, which encourage critical thinking to foster learning. There must be sufficient time for self-directed learning. Practical sessions, clinical practice and reflection should be well planned to encourage students to develop the habits of lifelong learning. The MD/MBBS/MBChB programme should provide adequate opportunities to acquire independent learning skills while developing clinical competence to the appropriate level. Experiential learning from extensive periods of direct patient contact is an essential component of the programme. It should be supported by skills laboratories and adequate numbers of patients/clients in health care training facilities.[13] **Appendices 2 and 3** show the proportion of the various teaching/learning activities as percentage of the total hours for each course in the programme.

(c) Methods of Assessment

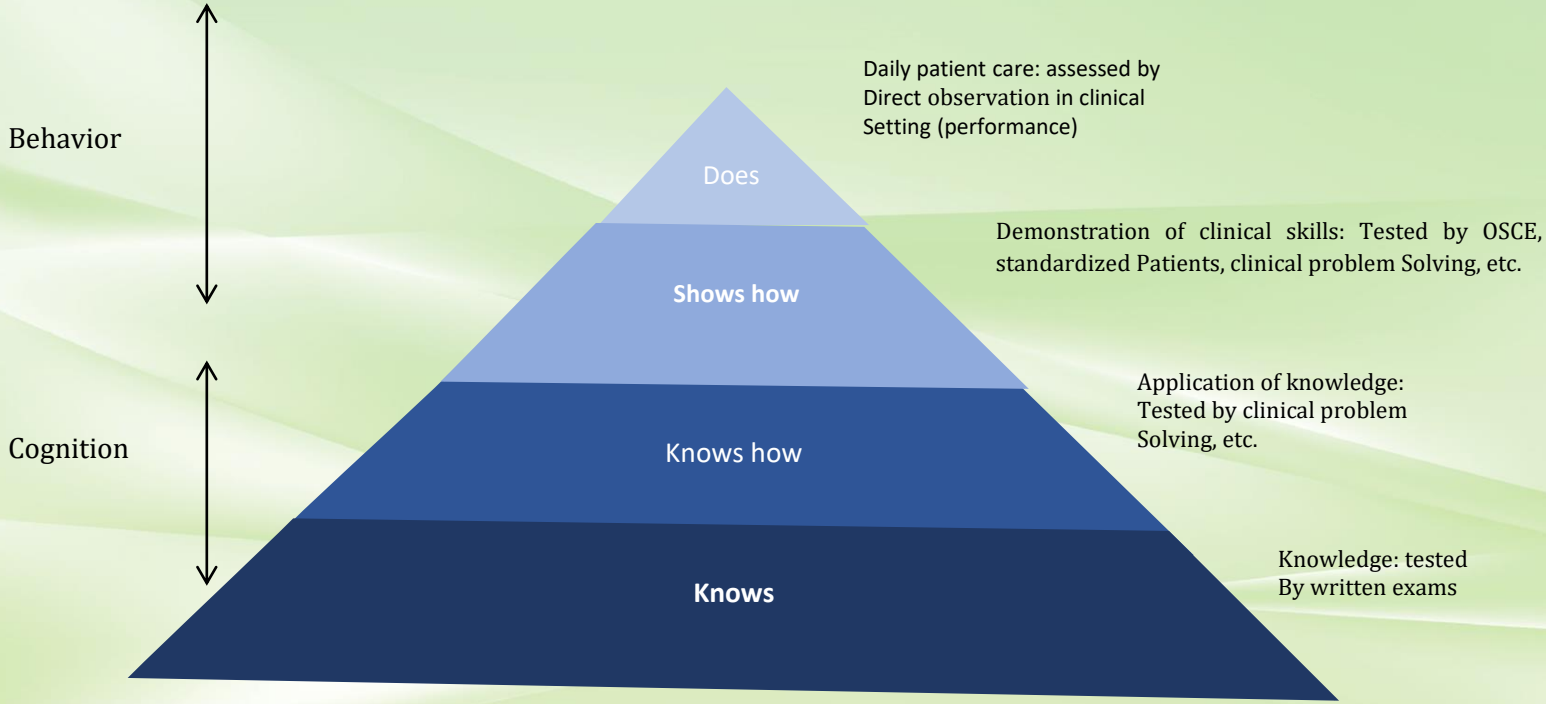


Figure 5. Miller's Pyramid for Clinical Assessment (*Modified from Miller GE, 1990)* [18]

[18] Suskie L: Assessing Student Learning: A Common-sense Guide, 2nd ed (San Francisco: Jossey-Bass), 167, 2009

Assessment strategies should be comprehensive and rigorous and concentrate on assessment for learning (Formative Assessment - FA) rather than an assessment of learning (Summative Assessment - SA). Assessment methods should be multiple, valid, reliable, aligned with teaching methods, the desired competencies, and specific learning outcomes. Clinical competence must be rigorously assessed to identify students who have not yet achieved learning outcomes and master competencies. Methods of achieving these aims may vary but should abide by principles elaborated in Miller's pyramid for assessment **(Figure 5)** and may include frequent direct observations of students, Objective Structured Clinical/Practical Examination (OSCE/OSPE), and multisource rating methods. In addition to clinical competence, curricula should assess students' professional attitudes and values.[13,17,19, 20]

3.6 The Learning Outcomes (LOs) and Curriculum alignment matrix

To check if the planned courses cover the LOs, developing a curriculum alignment matrix is essential, as indicated in section **2.2.3.** For each course, one must formulate the specific learning outcomes for that course and check how far this course contributes to the programme LOs. **Table 3** gives an example of a curriculum alignment matrix for the ELO's of the MD/MBBS/MBChB programme. For each subject, the contribution to the ELOs is given.

[13] Kennedy D, Hyland A, Ryan N: Writing Learning outcomes: A practical Guide. Implementing Bologna, 1-115, 2007.

[17] Bruner J: The process of Education. Cambridge, MA: The President and Fellows of Harvard College, 1960.

[19] Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9): 63–67.

[20] Ramani S, Leinster S, AMEE Guide no 34: Teaching in the clinical environment. Medical Teacher, 2008:30(4):347-364.

Table 3: An Example of a Curriculum Alignment Matrix

Core subject Area	EXPECTED LEARNING OUTCOMES (SEE TABLE 4)																													
	1	2	3	4	5	6	7	8	9	X	X	X	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Gross Anatomy & Histology	X						X			X	X	X					X							X	X					
Biochemistry and Molecular Biology	X						X			X	X	X					X							X	X					
ICT & Communication skills							X			X	X	X	X	X	X		X													
Professionalism & Ethics in Health and Research.			X				X	X		X	X	X													X				X	x
Embryology and Dissection	X						X			X	X	X					X							X	X					
Behavioral sciences	X						X	X		X	X	X	X	X	x															
Introduction to Community Health	X						X			X	X	X		X	x															
Physiology	X						X			X	X	X					X							X	X					
Microbiology & Immunology	X				X		X			X	X	X					X							X	X					
Parasitology & Entomology	X				X		X			X	X	X					X							X	X					
Epidemiology & Biostatistics	X						X			X	X	X					X							X	X			x	x	x
Health Systems & Development							X			X	X	X									X	X	X							
Community Health Practice	X	X					X	X	X	X	X	X		X	X								X			X				
Basic and Clinical Pharmacology	X				X		X			X	X	X						X						X	X					

Pathology	X				X		X			X	X	X					X							X	X					
Psychopathology	X				X		X			X	X	X					X							X	X					
Haematology and Blood Transfusion	X				X		X			X	X	X			X		X	X						X	X					
Management of Diseases	X				X		X	X		X	X	X		X	X			X						X	X					
Radiology and Imaging	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X												
Professionalism and Ethics in Medical Practice			X	X		X	X	X		X	X	X								X				X	X				X	X
Communicable and non-communicable disease control (CNCDC)	X	X			X		X	X	X	X	X	X		X		X												x	x	x
Research Proposal Development	X			X			X	X		X	X	X																X		X
Occupational Medicine	X						X	X	X	X	X	X		X	X						X				X			X	X	X
Management & Entrepreneurship							X			X	X	X									X	X	X							
Psychiatry and Mental Health	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
Anesthesiology and Critical care Medicine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Ophthalmology	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Emergency Medicine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
General Surgery	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Internal Medicine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X

Obstetrics and Gynecology	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Pediatrics and Child Health	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Otorhinolaryngology	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Orthopedics, Traumatology and Neurosurgery	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X
Community Health Rotation		X	X	X			X	X	X	X	X	X	X			X	X	X			X	X	X	X	X	X		X	X	X
Research Data Analysis and Reporting		X		X			X									X	X	X	X	X							X	X	X

Table 4: An Example of Interpretation of the Numbers in Table 3.

Number	Expected learning outcomes
1	Demonstrate knowledge of factors and mechanisms of disease conditions
2	Apply critical reasoning to solve health care challenges
3	Reflect upon personal strengths and limitations and actively work to correct deficiencies, seeking assistance when needed
4	Demonstrate knowledge of appropriate techniques for conducting complete and relevant clinical evaluation in a systematic manner
5	Use medical instruments and equipment
6	Demonstrate compassion and care towards patients regardless of differences in beliefs, identity, race, and culture
7	Demonstrate knowledge of methods of communication
8	Establish constructive relationships with patients, clients, and communities
9	Demonstrate respect for clients' views and understanding of healthcare-related issues and information
10	Demonstrate knowledge of one's role and those of other health professions to assess and address the health care needs of patients appropriately
11	Demonstrate ability to build teams working under a broad range of personal and practical circumstances.
12	Maintain effective working relationships with other health professionals, peers, and faculty
13	Demonstrates the ability to communicate with a patient/client.
14	Use appropriate patient/client counselling and educational techniques
15	Demonstrates awareness of the verbal and non-verbal communication of both the patient and the healthcare professionals (e.g., eye contact, gestures, facial expressions, posture) and responds to them appropriately.
16	Analyze evidence from scientific studies, guidelines and protocols related to clinical practice.
17	Demonstrate the ability to evaluate, integrate, and apply appropriate information from various sources to create cohesive, persuasive arguments and propose and design concepts.

Number	Expected learning outcomes
18	Demonstrate the ability to apply basic research methods for health and health-related issues, including research design, data analysis, and interpretation.
19	Use scientific evidence in providing health care services
20	Demonstrate ability to assess own skills and limitations.
21	Demonstrate knowledge of how the healthcare system functions (structures, policies, regulations, standards, and guidelines)
22	Uses appropriate health care resources for optimization of patient care.
23	Advocates for quality and optimal patient care systems.
24	Demonstrate knowledge on principles of health care professionalism
25	Demonstrate time manage skills and an appropriate level of preparedness
26	Demonstrate respect for everyone during the rotations, including site employees, patients/families, and the public.
27	Demonstrates accountability for errors conducted during provision of health care services
28	Demonstrate an increased ability to explain a health problem comprehensively.
29	Employ evidence/information in conducting a comprehensive analysis to solve health care challenges
30	Demonstrate ability to describe his/her perspectives along with those of others in solving health problems.

3.7 Assessments

Assessment is required in every phase of the medical profession development. As often said, assessment is the tail that wags the curriculum "dog," or in simple terms, assessment drives the curriculum and assessment drives learning. 19 Implementing the curriculum to achieve the learning outcomes requires a comprehensive, sound, and robust enough strategy to assess the requisite attributes and testing the acquisition of the essential knowledge, skills, and attitudes.[19, 20, 21, 22] During programme development and review, the MD/MBBS/MBChB programme developers, as a minimum should:

(i) Include assessment strategies that cover Formative Assessment (FA) or "Assessment for Learning" and Summative Assessment (SA), or "Assessment of Learning" on which decisions about progression are made.

(ii) Ensure assessment for learning play a prominent role because formative feedback is an essential element of developing competence.

(iii) Ensure assessment for learning is informal, frequent, dynamic, and non-judgmental, primarily for the benefit of the student's learning and not for the institution's progress tracking.

(iv) Ensure that FA is built into the design of all courses and modules and is not taken as tests to pass rather than learning opportunities.

(v) Ensure students get the maximum benefit from feedback, self-assessment, reflection, and the development of lifelong learning skills to enable students to fulfil their responsibilities as required by profession on professional values and fitness to practice; and achieve the outcomes set out in these benchmarks.

(vi) Assess all outcomes for graduates expected at appropriate points during the programme implementation, and only students who meet the expected outcomes are permitted to graduate.

(vii) Have assessments that include multiple methods and multiple assessors embedded within an effective educational system.

---

[19] Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9): 63–67.

[20] Ramani S, Leinster S, AMEE Guide no 34: Teaching in the clinical environment. Medical Teacher, 2008:30(4):347-364.

[21] Suskie L: Assessing Student Learning: A Common-sense Guide, 2nd ed (San Francisco: Jossey-Bass), 167, 2009.

[22] Walvoord BE, Anderson VJ: Effective Grading: A Tool for Learning and Assessment in College, 2nd ed (San Francisco: Jossey-Bass,), 13, 2010.

(i) Ensure assessments are "fit for purpose" – that is, they are valid, reliable, generalizable, feasible and fair.'

(ii) Consider educational impact (the effect of assessments - positive and otherwise, on students' learning and development), cost-effectiveness, and acceptability (the attitudes of students and others to the assessments).

(iii) Use blueprinting in assessment, which is a map or specification of assessment items based on educational outcomes whose primary function is to support the validity of assessment concerning its content – content validity. Blueprinting helps to align assessment items with the intended learning outcomes and students learning experience. A blueprint is essential and important to ensure the alignment of the validity of any assessment content with the intended learning outcomes and a learning experience. [22, 23, 24, 25]

(iv) When blueprinting, choose an appropriate assessment format for each outcome. For example, multiple-choice questions (MCQs) may be appropriate for testing knowledge and Objective Structured Clinical Examinations (OSCEs) for testing skills. Overlapping of the formats used for various outcomes is inevitable and necessary, confirming performance through triangulation.

(v) Provide evidence that every assessment has been designed to test a particular aspect, or aspects, or an appropriate outcome, or outcomes, in the programme through.

Methods of assessment

The type of assessment and method used plays a significant part in what is learnt. There is a wide range of assessment methods in Medical

---

19 Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9): 63–67.

20 Ramani S, Leinster S, AMEE Guide no 34: Teaching in the clinical environment. Medical Teacher, 2008:30(4):347-364.

21 Suskie L: Assessing Student Learning: A Common-sense Guide, 2nd ed (San Francisco: Jossey-Bass), 167, 2009.

22 Walvoord BE, Anderson VJ: Effective Grading: A Tool for Learning and Assessment in College, 2nd ed (San Francisco: Jossey-Bass,), 13, 2010.

23 Elshama SS: How to Use and Apply Assessment Tools in Medical Education? Iberoamerican J. Medicine 4: 351-359, 2020.

24 Raymond MR & Grande JP (2019): A practical guide to test blueprinting, Medical Teacher: https://doi.org/10.1080/0142159X.2019.1595556.

25 Ismail MA-A, Mat Pa MN, Jamilah A-MM, Yusoff MSB: Seven steps to construct an assessment blueprint: a practical guide. Education in Medicine Journal. 2020;12(1): 71–80: https://doi.org/10.21315/eimj2020.12.1.8.

Education, including written (essay) questions, written (Multiple Choice Questions – MCQ), patient management problems, Object Structured Clinical Examination (OSCE), Objective Structured Practical Examination (OSPE), Direct Observation of Procedural Skills (DOPS), student projects/fieldwork reports grading, critical reading of papers, rating scales, checklists, graded lecturer reports, short case assessment (SCA) and long case assessment (LCA), portfolios, logbook, graded trainer's report, audit, simulated patients, video assessment, simulators, self-assessment, peer assessment and standardized patients [19, 20, 21, 22]. Programme developers should align the selected assessment method with the learning outcomes and the teaching method.

3.8 Grading and Classification of the MD/MBBS/MBChB Programme

In the grading of students, medical schools and faculties shall grade with percentage converted into letter grades and Grade points (GP) range, and Grade Point Averages (GPAs) from raw marks using a five-point scale system. **Table 5** shows the assignment of raw marks to letter grades and GPs for the programme. In calculating GPAs, with the exceptional of optional or elective courses, scores from all core courses shall be included in computing the final grade for award based on the minimum number of credits required for the MD/MBBS/MBChB programme. The GPAs in the programme may be indicated in the semester and cumulatively in the Transcripts only but shall not be classified or interpreted in whatever form both in the transcript or degree certificate. The final award for the MD/MBBS/MBChB programme shall not be classified.

Table 5: Grading in MD/MBBS/MBChB programme

Letter grade	**A**	**B+**	**B**	**C***	**D**	**E**
Percent	75 -100	70 – 74.9	60-69.9	50-59*	40-49	00 – 39.9
Grade Point range	4.5 - 5.0	4.4 - 4.49	4.0 - 4.39	3.0 - 3.9	2.0 - 2.9	00 - 1.9
Remarks	Excellent (Distinction)	Very Good (Credit)	Good (Pass)	Satisfactory (Pass)	Fail	Fail

** Pass mark is 50%*

3.9 Curriculum Development and Implementation of Quality Assurance

Before the development of a new programme or revision, medical school should do market survey for new, and tracer studies of ongoing programmes. A tracer study is a survey of graduates from a university institution, which occurs sometime after graduation or the end of the training. The main purpose of a tracer study is to maintain curriculum relevance and provide targeted benefits to graduates to enhance the marketability of the educational programme. Tracer studies can also include stakeholders' consultations, employers', and graduates' interviews, and all these can provide data for quality improvement of the programme. The tracer study findings will guide the content of the curriculum and guide the formulation of the Intended Learning outcomes (ILOs) at all levels and promote the aligned teaching or the learning chain. The MD/MBBS/MBChB programme faculty should conduct tracer studies every seven years *(five (5) years of medical training, one (1) year of internship and one (1) year of practice).*

To assure quality, developers of the MD/MBBS/MBChB programme should develop and implement a Curriculum Map (CM). CMs facilitates quality assurance of curriculum development and implementation as they; appraise content integration, identify curricula gaps and redundancies, link learning outcomes with programme content, instruction methods, assessment tools, assessment schedules, and monitor and document compliance with curriculum accreditation standards. This promotes the alignment of teaching.[26] Aligned teaching is a process of tying together the different parts of teaching and learning for the student in a logical and defined order. It starts with the formulation of ILOs and makes the ILOs visible by designing *relevant, fit-for-purpose assessments and assessment criteria*. Then finally, the teaching and learning activities that will make the student achieve the ILOs are designed. This strategy and the CM make the process and the programme transparent, ensures coverage, and facilitates assessment efficiency & relevance of the assessments, thus assuring quality. An example of CM is shown in **Table 6**.

[26] Adamson L, Becerro M, Cullen P, Gonzalez-Vega L, Sobrino JJ, Ruan N: Quality Assurance and Learning outcomes. ENQA Workshop Report 17: 1-28, 2010.

Table 6: Example of Curriculum Map of MD/MBBS learning outcomes

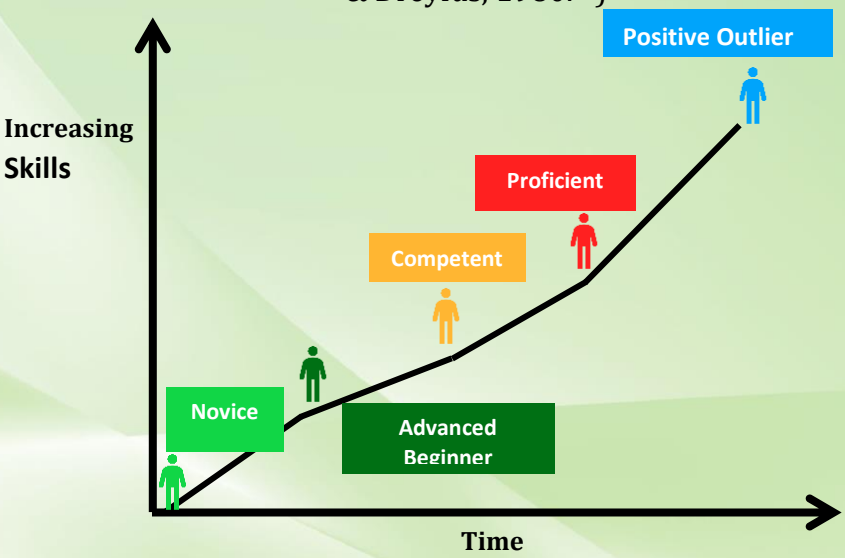
Courses and Codes	Programme Courses			
	MD 101	**MD 202**	**MD 303**	**MD404**
Learning Outcomes for the course	**Teaching Methods (activities)**			
	Lecture, Practical, demonstration	**Lecture, Practical, demonstration** **Field., lab rotations**	**Lecture, Practical, demonstration** **Clinical rotations**	**Lecture, Practical, demonstration** **Clinical rotations**
Describes laboratory tests for blood disorders	I, A (written exam),			
Interprets laboratory test for blood disorders	R	R, A (written exam and OSPE)	R	M, A (written examination, Mini CEX and DOPS)
Performs differential diagnosis of common blood diseases	R	R, A (written exam and OSPE)	R	M, A (written examination, Mini CEX and DOPS)

Key: "I" = Introduced; "R" = Reinforced and opportunity to practice; "M" = mastery is demonstrated (often at the senior or exit level); "A" = assessment evidence collected.

3.10 The role of Clinical apprenticeship

Clinical Education stage is the most important period in the development of health professionals. It is often characterized as an apprenticeship in which undergraduate learners are inducted and socialized into independent practitioners. The MD/MBBS/MBChB programme should follow the Dreyfus and Dreyfus model of skill acquisition that take the learners through five (5) stages of skills acquisition, i.e., Novice, advanced beginner, competent, proficient and expert/outlier **(Figure 6).**

Figure 6. Dreyfus Model of skills acquisition (Modified from Dreyfus & Dreyfus, 1980.[27])



The Dreyfus model requires students to learn from direct instructions and practice in real-time environments[27,28,29]. It assumes that the longer learners practice under supervision, the more they become experienced and competent. The model when applied to the whole programme, allows for valid assessment methods and schedules to be integrated into the curriculum to assess the progressive competency development milestones. The milestones should be tabulated to include all nine-competency domains, as exemplified in **Table 7. Appendix 4** shows minimum milestones requirements for the MD/MBBS/MBChB programme in details. As students become more experienced, they no longer need to be fully supervised but independent practicing as proposed by Millers' pyramid of competence (Figure 7). This is important for planning and assessing the minimum practical skills required for the programme as described in **section 3.12**.

---

[27] Dreyfus SE & Dreyfus HL: A five-stage model of the mental activities involved in directed skill acquisition (No. ORC-80-2). California Univ Berkeley Operations Research Center, 1980.

[28] Benner, P: Using the Dreyfus model of skill acquisition to describe and interpret skill acquisition and clinical judgment in nursing practice and education. Bulletin of science, technology & society, 24(3), 188-199, 2004.

[29] Carraccio CL, Benson BJ, Nixon LJ, & Derstine, PL: From the educational bench to the clinical bedside: translating the Dreyfus developmental model to the learning of clinical skills. Academic Medicine, 83(8), 761-767, 2008.

Table 7: MD/MBBS/MBChB Student Milestones According to Dreyfus Model (Applied to the whole programme)

Competency Domain: Clinical/Practical skills	**<u>Learning Outcome:</u> Performs primary assessment and initial stabilization of a critically ill patient**				
	Level 1: Novice (year 1)	Level 2: Advanced beginner (year 2)	Level 3: Competent (year 3)	Level 4: Proficient (year 4)	Level 5: Expert
	Recognizes abnormal vital signs	Recognizes when the patient is unstable and requires immediate intervention	Manages Critically ill patients	Recognizes in a timely fashion when further clinical intervention is futile in a critically ill patient	Develops policies and protocols for management and transfer of critically ill patients
		Performs primary assessment of critically ill patient	Prioritizes critical initial stabilization procedures in the stabilization of a critically ill patient	Integrates hospital support in the form of a multidisciplinary team for a problematic stabilization	

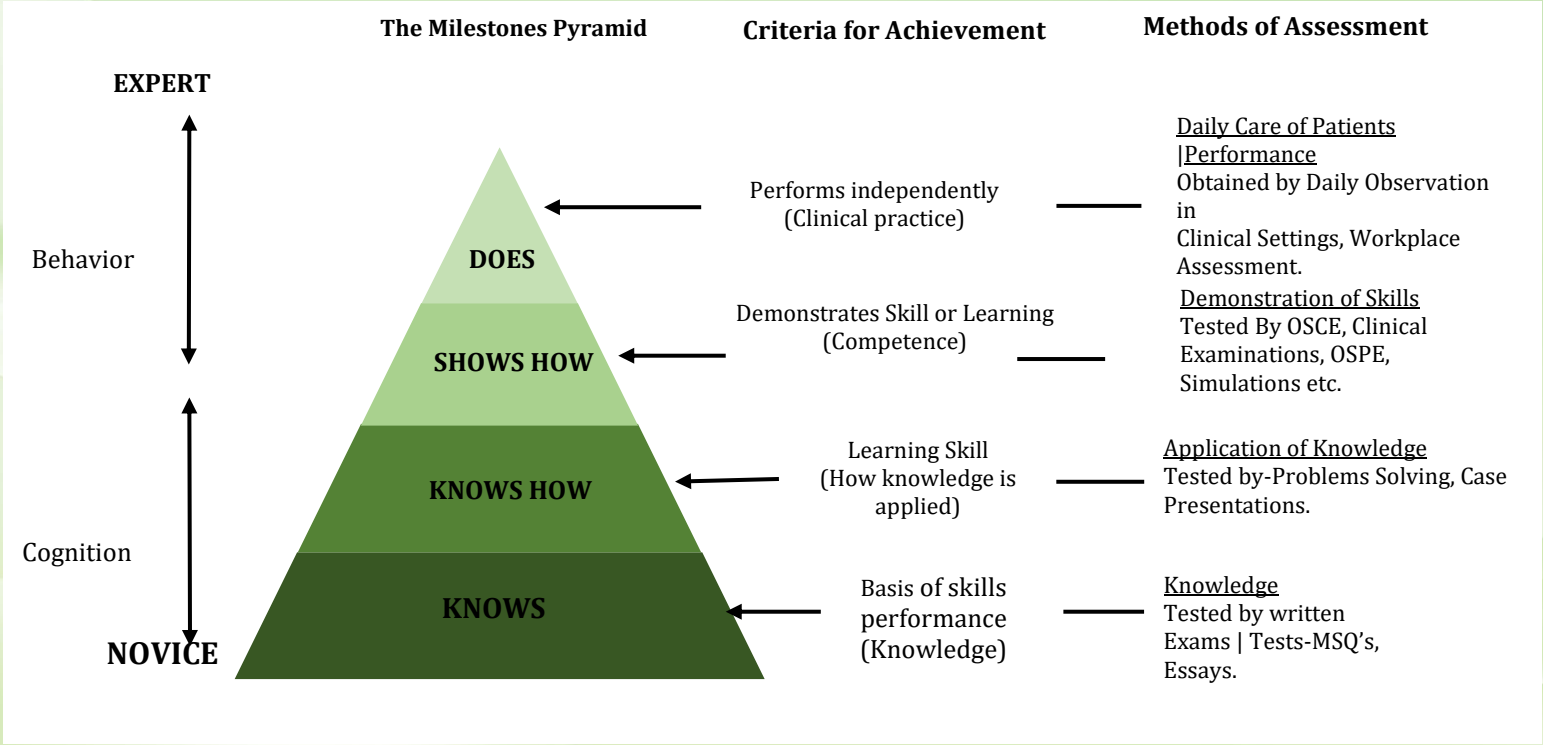


Figure 7: Miller's Pyramid of Clinical Learning Aligned with Performance and Assessment [20]

3.11 Elective/Research project

The objective of the elective / research project work is to allow students to develop basic research skills. These skills are essential for gaining future quality improvement activities such as basic scientific /clinical research and clinical audits. Programme developers should make the project work compulsory, and it must be graded. The project should be done in the community setting, hospital or laboratory setting in the teaching hospital. At the end of the Programme, students should submit a final project report and make an oral presentation.

3.12 Professional Practical skills and Procedures

The LOs in **section 3.4** define what medical graduates from all medical schools/faculties in Tanzania must know and do. The practical skills/procedures described in this section add synergy by defining minimum essential diagnostic, procedural, therapeutic, and administrative skills a medical graduate must be able to perform safely and effectively and identifying the level of supervision needed to ensure patients' safety [30].

Medical schools/faculties should ensure they include in their curricula design a list of minimum core practical skills (diagnostic, procedural, therapeutic, and administrative), which a medical graduate should be able to perform as shown in **Table 8**. They should in addition describe the expected circumstances or quality of performance of the skill or procedure (*see column 3 of table 8*) and minimum level of performance achievement so that they can practice safely.

The programmes should describe the three levels required for safe practice related to level 2 to 5 (*Knows how to Does*) of Dreyfus and Dreyfus Model of skills acquisition (**Figure 6).** As shown in **Table 8,** *Level one* required for safe practice is the advanced beginner (*practice in simulated environment*) where the graduate will not have performed the procedure on patients but on **manikins** or **simulated patients**. This means the graduate has knowledge and skills of the procedure but shall require performance under direct or structured supervision on living patients, for safety. *Level two* is competence (*performance under direct supervision*), meaning the graduate will have performed the task during medical training but will need a supervisor observing the

[30] Practical skills and procedures, General Medical Council 2019.

practice as the students perform the procedure on patients, to ensure safety before moving to the next level. *Level three* is a proficient student/graduate who is ready to practice and perform the skill or procedure on a patient with minimal or indirect supervision, meaning the new graduate will have performed the procedure under structured or direct supervision on patients during training. Thus, the graduate safely can perform the procedure without help but should have access for consultation if need arise. **Table 8** show examples of minimum (a) diagnostic, (b) procedural, (c) therapeutic and (d) administrative skills matrices written in generic form, required for a medical graduate. The last column in **Table 8** (Criteria Met), will be used by teachers to document skills/procedures that were achieved/not achieved for remediation. Medical schools/faculties should therefore use the examples to develop detailed minimum requirements in their programmes description to cover all systems, and all courses of the MD/MBBS/MBChB programme. **Appendix 5** shows a detailed list of Minimum diagnostics, procedural, therapeutic, and administrative skills required for a medical graduate.

Table 8: Description of Minimum Professional Practical skills for Medical Graduates.

(a) Example matrix showing Diagnostic Skills, their description and competency level achievement upon graduation.

SN	Skill	Description	Competence Level Achievement			Competence Level Description	Criteria Met (Yes/No)
			Novice	Competent	Proficient		
1.	Take appropriate history and perform a physical examination of all patients in major disciplines, document, and plan management.	• Takes history appropriately for all disciplines of medicine and document accurately. • Perform physical examinations appropriately. • Elucidate and interpret the patients' symptoms and physical findings and record them accurately. • Plan the course of action guided by the history and physical findings			**X**	Safe to practise under minimal supervision	
2.	Take baseline physiological observations and record them appropriately	Measure temperature, respiratory rate, pulse rate, blood pressure, oxygen saturation and urine output.			**X**	Safe to practise under minimal supervision	
3.	Carry out peak expiratory flow respiratory function test	Explain to a patient how to perform a peak expiratory flow, assess that it is performed adequately and interpret results.			**X**	Safe to practise under minimal supervision	

SN	Skill	Description	Competence Level Achievement			Competence Level Description	Criteria Met (Yes/No)
			Novice	Competent	Proficient		
4.	Perform direct ophthalmoscopy	Perform basic ophthalmoscopy and identify common abnormalities.			**X**	Safe to practise under minimal supervision	
5.	Perform otoscopy	Perform basic otoscopy and identify common abnormalities.			**X**	Safe to practise under minimal supervision	
6.	Take blood cultures (Take samples of venous blood to test for the growth of infectious organisms)	Take samples of venous blood to tests for the growth of infectious organisms.		X		Safe to practise under direct supervision	
7.	Measure capillary blood glucose	Measure the concentration of glucose in the patient's blood at the bedside using appropriate equipment. Record and interpret the results.			X	Safe to practise under minimal supervision	
8.	Place leads and perform an Electrocardiogram (ECG)	Set up a continuous recording of the heart's electrical activity, ensuring that all ECG leads are correctly placed.			X	Safe to practise under Minimal supervision	
9.	Perform a bone mineral density test and interpretation	Request a bone density test appropriately and interpret the results accurately.		X		Safe to practice under direct supervision	
10.	Interpret basic CT, and MRI results	Confirm the patient and imaging details and correctly describe and document the CT scan and MRI findings		X		Safe to practice under direct supervision	

(b) Example matrix showing Diagnostic Skills, their description and competency level achievement upon graduation

SN	Procedure	Description of Procedure	Competence Level Achievement			Competence Level Description	Criteria Met (Yes/No)
			Novice	Competent	Proficient		
1..	Perform Femoral vein cannulation.	• Obtain informed consent from the patient and explain the risks and benefits • Choose an appropriately sized central venous catheter for the patient. • Perform the technique correctly and appropriately with or without USS guidance.			X	Safe to practice under minimum supervision	
3.	Perform pericardiocentesis	• Correctly performs pre-procedure safety and sterility precautions. • Correctly insert the appropriate needle. • Successfully aspirates and decompress the tamponade	X			Safe to practice under simulated conditions before direct supervision	

(c) Example matrix showing Therapeutic Skills, their description and competency level achievement upon graduation

SN	Skill	Description of Procedure	Competence Level Achievement			Competence Level Description	Criteria Met (Yes/No)
			Novice	Competent	Proficient		
1.	Instruct patients in the use of devices for inhaled medication and others	Correctly explain to patients how to use an inhaler, including spacers, and check that their technique is correct.		x		Safe to practise under minimal supervision	
2.	Prescribe and administer oxygen	Prescribe and administer oxygen safely using a delivery method appropriate for the patient's needs and monitor and adjust oxygen as needed.			X	Safe to practise under minimal supervision	
3.	Prepare and administer injectable drugs (Intramuscular, subcutaneous, intravenous) drugs	Prepare and administer injectable drugs correctly and safely.		x		Safe to practise under direct supervision	

(c) Example matrix showing Administrative Skills, their description and competency level achievement upon graduation

SN	Skill	Description of Procedure	Competence Level Achievement			Competence Level Description	Criteria Met (Yes/No)
			Novice	Competent	Proficient		
1.	Obtain informed consent for procedures	• Correctly explain to patients all procedures to be done; ascertain comprehension; mention the benefits and risks involved; and proceed when clients consent. • Correctly document the informed consent process			x	Safe to practise under minimal supervision	
2.	Certify death and write death certificate	• Correctly confirm absence of vital (pulse, heart beats, blood pressure, respiration) and neurological signs (dilated and fixed pupils, absent limb reflexes) • Accurately fill in dully approved death certificate forms			X	Safe to practise under minimal supervision	

For each professional procedure there are **minimum generic requirements** which the medical graduate should demonstrate during practice. In their design of programmes, medical schools/faculties should in addition describe the minimum generic requirements for each procedure. **Table 9** shows the minimum generic requirements for each professional procedure.

Table 9: Minimum Generic Requirements for Each Skill/Procedure

SN	Requirement
1.	Self-introduction
2.	Check the patient's identity.
3.	Confirm that the Procedure is required
4.	Explain the Procedure (possible risks, complications
5.	Request informed consent for Procedure
6.	Follow universal precautions
7.	Label samples according to guidelines appropriately.
8.	Document the Procedure accurately following hospital policy/guidelines.
9.	Observe of confidentiality
10.	Interpret and act on any results
11.	Plan the appropriate aftercare and monitoring of the patient

3.13 Physical Infrastructure

Traditional medical education focuses on the learners, the educators, and the curriculum while tending to overlook the role of the designed environment. Experience indicates, however, that medical education processes and outcomes are sensitive to the qualities and disposition of the spaces in which it occurs, including the clinical education within the patient care environment, known as the clinical learning environment. Thus, buildings, classrooms, laboratories, libraries, clinical spaces, and other physical infrastructure are crucial learning environments in medical schools/faculties for the implementation of the programme. This is supported by overwhelming evidence that quality infrastructure facilitates curriculum implementation by providing better instruction, improves student outcomes, and reduces attrition rates, among other benefits.

At the same time, medical education is rapidly changing, influenced by, among other factors, the altered societal expectations, rapidly changing medical science, and the diversity of pedagogical techniques. Changes in societal expectations put patient safety at the forefront and raise the ethical issues of learning interactions and procedures on live patients and the need for skills laboratories. The educational goals of using ICT and other technologies in medical education and curriculum implementation include facilitating basic knowledge acquisition, improving decision-making, enhancing perceptual variation, improving skill coordination, practicing for rare or critical events, learning team training, and improving psychomotor skills, and all these are important for medical education. The Universities/medical Colleges in Tanzania should have sufficient, and quality physical facilities to ensure that the curriculum is delivered adequately and in a safe environment. Physical facilities should include the physical spaces and equipment available to implement the planned curriculum for the given number of students and academic staff. The training institutions shall have appropriate basic minimum physical teaching and administrative facilities for the number of staff, and students as highlighted below: -

3.13.1 Physical Resources

Physical resources include the **pre-clinical** and **clinical facilities**.

(a) The preclinical facilities should include the following: -

(i) administrative offices

(ii) staff offices
(iii) Lecture rooms and tutorial rooms adequately equipped for face to face and distance learning.
(iv) Teaching Laboratories.
(v) Appropriately equipped Technical and Skills Laboratories.
(vi) Library with both physical and online resources.
(vii) Information & communication technology services

(b) Clinical Training Resources

Teaching hospitals are key components in the teaching of clinical courses and procedures to medical students. The hospitals must attain and maintain minimum requirements to be in compliance with all relevant acts that govern the running of health facilities as well as higher educational institutions. The teaching hospitals should have been accredited by the Medical Council of Tanganyika (MCT) and should have a minimum of the following Functional units/departments:-

(i) Internal medicine including Dermatology
(ii) General surgery
(iii) Paediatrics and Child Health
(iv) Obstetrics and Gynaecology.
(v) Psychiatry and Mental health.
(vi) Emergency and Critical care medicine.
(vii) Rehabilitation.
(viii) Pathology (including post-mortem facilities), and Laboratory Medicine.
(ix) Radiology and Imaging.
(x) Otorhinolaryngology (ORL)/ENT.
(xi) Ophthalmology.
(xii) Orthopaedics, Trauma and Neurosurgery.
(xiii) Anaesthesiology.
(xiv) Operating Theatres.
(xv) Community Health.
(xvi) Outpatient Clinics.
(xvii) Department of Pharmacy.
(xviii) Medical Information Systems
(xix) Dental Department

Details of Minimum requirements for physical resources are described in Part 6 of the Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition 2019 [31]. Curricula developers should ensure these are described in **section 7.0** of the Curriculum Framework (Annex 3.2 - Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition 2019, when developing or revising their curricular.

3.13.2 Relationship between Medical Schools/Faculties and the Hospitals

Every medical school/faculty in Tanzania should have **a primary teaching hospital**. The school/faculty may use more than one teaching hospital, if these hospitals are approved by the MCT and meet the standards prescribed in the TCU Standards and Guidelines for University Education in Tanzania. In the case where the University/College does not own the Hospital, there should be a clearly stipulated Memorandum of Understanding (MoU), between the University (School/Faculty) and the Hospital, which must include the following:

(i) Total number of staff required for service, research and teaching based on infrastructure and facilities available.
(ii) The distribution of staff between University (School/Faculty) and the Hospital, and state clearly their role in the teaching, research, and patient care.
(iii) Resources sharing in areas of financial, human, consumables, and equipment, which must meet the minimum requirements.
(iv) The available quality assurance in the Hospital.
(v) The relationship between the Hospital and the University (School/Faculty) departments.
(vi) The conflicts resolution mechanism between the University (School/Faculty) and the Hospital.

3.13.3 Minimum Requirements for a Teaching Hospital

The Universities and Colleges of health sciences in Tanzania should observe the following minimum requirements for their teaching hospitals: -

(i) Functional Units (Departments) as stipulated in 3.1 (b) above.

[31] Tanzania Commission for Universities, Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019

(ii) Bed capacity to give a **student to bed** ratio of **1:4**.
(iii) Bed occupancy rate of at least **80%**.
(iv) Theatre to bed ratio of not more than **1:50**.
(v) Tutorial rooms and side labs in the departments for the students.
(vi) Policy on consumables.
(vii) Adherence to policy on infection prevention and control.
(viii) Adherence to policy on occupational health and safety.
(ix) Adherence to staffing norms.
(x) Adherence to policy on standard operating procedures.
(xi) The primary teaching hospital shall have been declared by a higher authority, or shall declare itself, as a training institution for teaching Medical and other health science programmes to ensure medical student to bed ratio of **1:4** is maintained.
(xii) ICT services and facility.

The requirements for teaching hospitals are further described in Part 6 Annex 6.5 of the Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019 [31] and in the East African Community Medical and Dentists Board/Councils Regional Guidelines for Inspection and Recognition of Medical Schools and Teaching Hospitals in Partner States, 2015. [32]

3.14 Information Communication Technology Resources

The universities of health sciences should provide adequate access to virtual and physical information resources to support the curriculum. These should be adequate and accessible to both students and staff, including online and physical library resources. Minimum requirements are prescribed in Part 6, Standard 6.6 of the Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019[31].

[31] Tanzania Commission for Universities, Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019
[32] East African Community Medical and Dentists Board/Councils. Regional Guidelines for Inspection and Recognition of Medical Schools and Teaching Hospitals in Partner States, 2015.

GLOSSARY OF TERMS

"Accreditation" means the action or process of officially recognizing a programme or institution as having a particular status or being qualified to perform a particular activity by a regulatory authority.

"Assessment" means the systematic basis for making inferences about the learning and development of students. It is the process of defining, selecting, designing, collecting, analyzing, interpreting, and using information to increase students' learning and development.

"Attitude" means a set of emotions, beliefs, and behaviors toward a particular object, **person**, thing, or event. **Attitudes** are often the result of experience or upbringing, and they can have a powerful influence over behavior.

"Bachelor's degree" means a degree in which the holder of the qualification will be able to apply knowledge, skills and understanding in a wide and unpredictable variety of contexts with substantial personal responsibility, responsibility for the work of others and responsibility for the allocation of resources, policy, planning, execution, and evaluation.

"Benchmark" means a point of reference against which something may be measured.

"Benchmark standards" means subject benchmark statements set out expectations about standards of degrees in various 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.

"Bloom's taxonomy" means a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding to guide the development of assessment, curriculum, and instructional methods such as questioning strategies.

"Client" means someone for whom a professional person or organization is providing a service or doing some work. Example in health facilities client is a patient.

"Clinical reasoning" means the process by which a therapist interacts with a patient, collecting information, generating, and testing hypotheses, and determining optimal diagnosis and treatment based on the information obtained.

"Clinical skills" means any discrete and observable act within the overall process of patient care, including all those **skills** required during patient-doctor interactions and in addition communication **skills** required during interactions with other health professionals as part of patient care.

"**Cognition"** means the mental processes involved in gaining knowledge and comprehension.

"College" means an educational institution or establishment, particularly one providing higher education or specialized professional or vocational training.

"Competencies" means a product of individual characteristics and achieved learning outcomes.

"Core subject" means the essential subjects offering a thorough foundation of the discipline. The core subjects are the backbone of the discipline.

"Course (unit)" means 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" means an instrument for checking the contribution of a course, unit, or module to the achievement of the programme learning outcomes.

"Curriculum" means 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 competencies *(see programme also).*

"Elective subjects" means subjects out of which a student must select, to deepen or to broaden their learning experience in the programme.

"Equivalency" means having the same value without being uniform.

"Formative assessment" means a planned, ongoing process used by all students and teachers during learning and teaching to elicit and use evidence of student learning to improve student understanding of intended disciplinary learning outcomes and support students to become self-directed learners. It is assessment for learning.

"Generic learning outcomes" means those learning outcomes expected from all academically trained graduates, irrespective of the study programme. Examples of generic learning outcomes are problem-solving, communication skills, and the ability to cooperate.

"Graduate" means a person who has successfully completed a course of study or training, especially a person who has been awarded an undergraduate or first academic degree

"Harmonization of programmes" means that the programmes are comparable based on agreed benchmarks.

"Internship" means a period of supervised training at the workplace as an essential part of the programme. It offers the student the opportunity to become acquainted with his/her future job. It provides the student with experiences at the working floor level.

"Knowledge" means the body of facts, principles, theories, and practices related to a field of work or study. It is the outcome of the assimilation of information through learning and is described as theoretical and/or factual.

"Learning outcomes" are statements of what a learner knows, understands, and can do on completion of a learning process, which are defined in terms of knowledge, skills, and attitude.

"Master's degree" means a degree in which the holder of the qualification will be able 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, able to work autonomously and in difficult and unpredictable situations.

"Module" means a formal learning experience encapsulated into a block of study, usually linked to other modules to create a course or a programme of study.

"Module description" means a statement of the aims, objectives/learning outcomes, content, learning and teaching processes, mode of assessment of students and learning resources applicable to a module or block of study.

"Programme" means 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 competencies *(see curriculum also).*

"Programme objectives" means the overall specification of the intention or purpose of a programme of study.

"Project work" means a form of study, which is problem oriented. The project is usually based on an actual existing problem, which may be linked to an internship and leads to possible solutions. The project may be practical or research oriented.

"Qualifications' framework" means an instrument for developing and classifying qualifications according to a set of criteria for levels of learning and skills and competencies achieved.

"Quality" means the degree to which an object or entity (e.g., process, product, or service) satisfies a specified set of attributes or requirements. **Quality** is the degree to which a set of inherent characteristics fulfils requirements.

"University Qualifications Framework (UQF)" means an instrument used by Universities in Tanzania to develop and classify qualifications

according to a set of criteria for levels of learning and skills and competencies achieved.

"Skills" The ability to apply knowledge and use know-how to complete tasks and solve problems.

"Soft skills" means non-technical skills that relate to how one works

"Summative assessment" means set of procedures and activities used to evaluate student learning, skill acquisition, and academic achievement at the conclusion of a defined instructional period—typically at the end of a unit, module, course, semester, year, or programme, by comparing it against a universal standard or school benchmark.

REFERENCES

1. URT (2005): The Universities Act No 7, 2005. Dar es Salaam MHEST, 2005 (Section 5(1) (f).
2. Mosha H: The State and Quality of Education in Tanzania: A Reflection. University of Dar es Salaam.
3. URT: Education Sector Development Programme, Primary Education Development Plan (PEDP) I-2000-06, PEDP II 2007 - 11, PEDP III 2012-16.
4. URT: Education Sector Development Programme Secondary Education Development Plan (SEDP) 2004 – 2009.
5. Laiser S: An Assessment of Factors Influencing Mushrooming of Private Higher Learning Institutions in Tanzania: A Theoretical Perspective. Tanzania Journal of Education, 3: 112-125, 2017.
6. Inter-University Council for East Africa – Benchmarks for The Bachelor of Computer Science and the Bachelor of Information Technology Programmes. IUCEA, 2015.
7. Tanzania Commission for Universities (TCU). University Qualifications Framework (UQF). First Edition. Dar-es-Salaam (2012).
8. Tanzania Commission for Universities (TCU). Quality Assurance – General Guidelines and Minimum Standards, 2014.
9. The Inter-University Council for East Africa (IUCEA). (2010). A *Road map to Quality. Handbook for Quality Assurance in Higher Education.*
10 Harden RM: Learning outcomes and instructional objectives: is there a difference? Medical Teacher, 24, (2), 2002, 151–155.
11. Noghabaei G, Arab M, Ghavami B, Hosseini-Zijoud S-M: Expected learning outcomes of medical school graduates. Journal of Advances in Medical Education (JAMED) 3, 2016.
12. Thorsson I: Formulating Learning Outcomes. Karolinska Institute, 2007.
13. Kennedy D, Hyland A, Ryan N: Writing Learning outcomes: A practical Guide. Implementing Bologna, 1-115, 2007.
14. Mahajan M and Sarjit-Singh MK: Importance and Benefits of Learning Outcomes. *IOSR J. of Humanities Social Science (IOSR-JHSS 22(3), 65-67. 2017*
15. Bloom BS, Engelhart MD, Furst EJ, Hill W h, & Krathwohl DR: Taxonomy of educational objectives: the classification of educational goals; Handbook I: Cognitive Domain New York, Longmans, Green, 1956.
16. Anderson LW, Krathwohl DR, Airasian PW, Cruikshank KA, Mayer RE, Pintrich PR, Raths J, & Wittrock MC: A taxonomy for learning and teaching and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition). New York: Longman, 2001
17. Bruner J: The process of Education. Cambridge, MA: The President and Fellows of Harvard College, 1960.

18. Hoque EM: Three Domains of Learning: Cognitive, Affective and Psychomotor. JEFLER, 2: 45-52, 2017.
19. Miller GE, The Assessment of Clinical Skills/Competence/Performance; Acad. Med. 1990; 65(9): 63–67.
20. Ramani S, Leinster S, AMEE Guide no 34: Teaching in the clinical environment. Medical Teacher, 2008:30(4):347-364.
21. Suskie L: Assessing Student Learning: A Common-sense Guide, 2nd ed (San Francisco: Jossey-Bass), 167, 2009.
22. Walvoord BE, Anderson VJ: Effective Grading: A Tool for Learning and Assessment in College, 2nd ed (San Francisco: Jossey-Bass,), 13, 2010.
23. Elshama SS: How to Use and Apply Assessment Tools in Medical Education? Iberoamerican J. Medicine 4: 351-359, 2020.
24. Raymond MR & Grande JP (2019): A practical guide to test blueprinting, Medical Teacher: https://doi.org/10.1080/0142159X.2019.1595556.
25. Ismail MA-A, Mat Pa MN, Jamilah A-MM, Yusoff MSB: Seven steps to construct an assessment blueprint: a practical guide. Education in Medicine Journal. 2020;12(1): 71–80: https://doi.org/10.21315/eimj2020.12.1.8.
26. Adamson L, Becerro M, Cullen P, Gonzalez-Vega L, Sobrino JJ, Ruan N: Quality Assurance and Learning outcomes. ENQA Workshop Report 17: 1-28, 2010.
27. Dreyfus SE & Dreyfus HL: A five-stage model of the mental activities involved in directed skill acquisition (No. ORC-80-2). California Univ Berkeley Operations Research Center, 1980.
28. Benner, P: Using the Dreyfus model of skill acquisition to describe and interpret skill acquisition and clinical judgment in nursing practice and education. Bulletin of science, technology & society, 24(3), 188-199, 2004.
29. Carraccio CL, Benson BJ, Nixon LJ, & Derstine, PL: From the educational bench to the clinical bedside: translating the Dreyfus developmental model to the learning of clinical skills. Academic Medicine, 83(8), 761-767, 2008.
30. Practical skills and procedures, General Medical Council 2019.
31. Tanzania Commission for Universities, Handbook for Standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019.
32. East African Community Medical and Dentists Board/Councils. Regional Guidelines for Inspection and Recognition of Medical Schools and Teaching Hospitals in Partner States, 2015.

APPENDICES

Appendix 1: List of the Minimum ELOs (53) for MD/MBBS/MBChB Programme

Competency Domain 1: Knowledge for Doctor of Medicine

i. Apply knowledge of the structure and functions of human body in management of diseases
ii. Demonstrate knowledge of the causes and mechanisms of diseases to manage congenital and acquired conditions
iii. Employ knowledge of physical, psychological, and socio-cultural factors in the causation and progression of diseases to plan an approach to prevent and manage common health challenges
iv. Apply clinical reasoning to solve clinical problems
v. Employ knowledge of pathophysiology of communicable diseases to diagnose and manage clients with a focus on HIV and AIDS, COVID-19 and other and re-emerging infections.
vi. Employ knowledge of pathophysiology of communicable, non-communicable diseases, and injuries prevalent to diagnose and manage clients with such conditions.
vii. Appraise common conditions during childhood and motherhood to appropriately manage childhood and motherhood conditions
viii. Appraise different control and prevention strategies for common health and health related conditions

Competency Domain 2: Practical/ Clinical Skills for Doctor of Medicine

i. Gather complete and focused history in an organized manner, appropriate to the clinical situation
ii. Conduct complete and relevant physical examination in a systematic manner
iii. Document clinical findings in an organized and comprehensive manner
iv. Formulate and prioritize correct and appropriate plans for patient/client management (e.g., palliative and hospice care)
v. Use medical instruments and equipment
vi. Perform common medical/surgical procedures and alleviate patient's pain associated with procedures
vii. Follow universal asepsis and infection control measures

viii. Provide appropriate and holistic patient/ client care
ix. Manage common medical and surgical conditions

Competency Domain 3: Relationship with Patients, Clients and Communities

i. Establish constructive(therapeutic/professional) relationships with clients and or communities to address their health needs and preferences.
ii. Provide counselling for health and health related issues
iii. Provide health services to individuals and groups that is appropriate to their different backgrounds.

Competency Domain 4: Communication skills

i. Deliver effective health promotion messages to educate communities
ii. Communicate effectively scientific and clinical findings (oral and in written form)
iii. Communicate effectively with patients, families, and the public on health issues and policies.
iv. Communicate effectively with colleagues within one's profession or other health professionals.

Competency Domain 5: Intra and inter-professional practice and collaboration

i. Apply professional knowledge to contribute effectively to teamwork to deliver client centred care.
ii. Demonstrate respect for, roles/responsibilities and expertise of other professionals to improving the health of the population
iii. Collaborate with others to develop an intervention plan that takes into accounts determinants of health, available resources and range of activities that contribute to health

Competency Domain 6: Maintaining Good Practice

i. Systematically evaluate one's own performance and practice (reflective practice)
ii. Regularly seek information necessary to improve professional practice (life-long learning)
iii. Apply evidence in decision making
iv. Incorporate formative evaluation feedback into daily work practice

v. Apply leadership and managerial skills
vi. Use information technology to optimize learning, health care delivery and education
vii. Promote accreditation, monitoring, evaluation and audit to provide quality care in health and health related services.
viii. Set priorities and manage time to balance professional responsibilities, outside activities and personal life

Competency Domain 7: Working within the System and Context of Health

i. Demonstrate knowledge of how the health care system functions (structures, policies, regulations, standards, and guidelines)
ii. Practice effectively in various health care delivery settings and systems (hospitals, ministries, NGO's, communities, industry)
iii. Demonstrate leadership skills in managing health care delivery within the health care system.
iv. Employ principles and strategies of cost effectiveness into health service delivery
v. Identify and report errors of the health care system and challenges when delivering health care services.
vi. Apply entrepreneurial skills for advancement of practice and the profession

Competency Domain 8: Professionalism

i. Maintain professional ethical standards including but not limited to confidentiality, informed consent, practice errors, avoid conflicts of interest)
ii. Show sensitivity and responsiveness to diversity including but not limited to culture, age, socioeconomic status, gender, religion, and disability)
iii. Show respect, compassion, and integrity while interacting with patients, teachers, clients, communities, and other health professionals
iv. Demonstrate accountability to patients, society and the profession when providing health care services.

Competency Domain 9: Scientific Inquiry and Critical thinking

i. Adhere to scientific inquiry procedures in solving problems.
ii. Apply appropriate research methods to conduct scientific inquiry

iii. Evaluate the strength and/or weaknesses of clinical and research findings.
iv. Defend scientific arguments/ clinical findings
v. Apply clinical reasoning to solve health and health related problems.
vi. Analyze new knowledge, guidelines, standards, technologies, products, or services that have been demonstrated to improve outcomes
vii. Evaluates alternative points of views or methodologies.
viii. Communicate findings effectively while appreciating and respecting disagreements and the value of constructive criticism.

Appendix 2: Description of Courses in the Programme

(Give outlines of all courses or modules to be taught and learnt within the programme, including a course or modules matrix, in each course. Each course in the programme should be described and structured as in the example given for anatomy, from year one to five Refer also to Annex 3.2 of the Handbook for standards and Guidelines for University Education in Tanzania, 3rd Edition, 2019, section 6.0)

Example of the Course description.

ANATOMY - GROSS ANATOMY AND HISTOLOGY (Code: AN 100)

Course Title:

Course aim:

Course expected learning outcomes
At the end of the course, learners will be able to: -
(List the Learning outcomes of the course – CLOs)

Course status: CORE

Course credits:

Total hours spent:

Organization of the Course

Module	Name	Lecture (Hrs) (35%)	Tutorial/Seminar (Hrs) (15%)	Assignment (Hrs) (10%)	Ind. Studies (Hrs) (10%)	Practical (Hrs) (30%)	Total (Hrs) (100%)	Credits
1.	Gross Anatomy							
2.	Cell biology and histology							
Total								

(The total hours and credits in a course should be like those indicated in the course as listed in the Normal Learning matrix – Appendix 3)

Course Content

Module 1.0: Gross Anatomy

Topic	Title	Lecture (Hrs) (35%)	Tutorial/Seminar (Hrs) (15%)	Assignment (Hrs) (10%)	Ind. Studies (Hrs) (10%)	Practical (Hrs) (30%)	Total (Hrs) (100%)	Credits
1.								
2.								
3.								
4.								
5.								
	etc.							
19.								
TOTAL								

Course content

(Describe the Course content or in modularized course the modules' content)

Module 1.0: Gross Anatomy

(List the module topics and describe them further)

Module 2.0: Cell biology and histology

Topic	Title	Lecture (Hrs) (35%)	Tutorial/Seminar (Hrs) (15%)	Assignment (Hrs) (10%)	Ind. Studies (Hrs) (10%)	Practical (Hrs) (30%)	Total (Hrs) (100%)	Credits
1.								
2.								
3.								
4.								
5.								
	etc.							
20.								
TOTAL								

Module 2.0: Cell biology and histology
(List the module topics and describe them further)

Teaching and Learning Activities: *(That would facilitate achievement of planned learning outcomes).*

Assessment methods: *(Describe assessment method and criteria on how to achieve the learning outcomes for the course that are also aligned to the teaching methods).*

Recommended reading materials (*list of up-to-date textbooks, journals, and reference books)*

Textbooks *(Example):*

(i) Anthony Mescher: Junqueira's basic histology: text and atlas, McGraw-Hill Medical Publisher, London.

Reference materials *(Example)*

(i) Richard L. Drake, Wayne Vogl, Adam W. M. Mitchell & Henry Gray: Gray's Anatomy for Students, Churchill Livingstone/Elsevier: London.

Appendix 3: Normal Learning Matrix for MD/MBBS/MBChB Programme

(Describe each course and include Course Title, Code, whether the course is core or electives/optional, etc. N.B. the % of the time to be assigned can be determined with the help of table 5 in UQF. However, that as students start clinicals, practical training hours increase proportionately).

Semester 1 – Year 1									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (35%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (30%)**	**Total (Hrs) (100%)**	**Credits**
	Gross Anatomy and Histology								
	Biochemistry and Molecular Biology								
	ICT & Communication skills								
	Professionalism & Ethics in Health and Research								
Total								**658**	**65.8**

Semester – 2 Year 1									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (35%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (30%)**	**Total (Hrs) (100%)**	**Credits**
	Embryology and Dissection								
	Behavioural science								
	Introduction to Community Health								
	Physiology								
Total								**658**	**65.8**

Semester 3 – Year 2									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (35%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (30%)**	**Total (Hrs) (100%)**	**Credits**
	Microbiology/Immunology								
	Parasitology & Entomology								
	Epidemiology & Biostatistics								
	Health Systems & Development								
Total								**658**	**65.8**

Semester 4 – Year 2									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (35%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (30%)**	**Total (Hrs) (100%)**	**Credits**
	Community Health Practice								
	Basic and Clinical Pharmacology								
	Pathology								
	Psychopathology								
	Haematology and Blood Transfusion								
Total								**658**	**65.8**

Semester 5 – Year 3 (Junior Clerkship)									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (30%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (35%)**	**Total (Hrs) (100%)**	**Credits**
	Management of Diseases								
	Radiology and Imaging								
Total								**658**	**65.8**

Semester 6 – Year 3 (Junior Clerkship)									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (30%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (3%)**	**Total (Hrs) (100%)**	**Credits**
	Professionalism and Ethics in Medical Practice								
	Communicable and non-communicable disease control								
	Research Proposal Development								
	Occupational Medicine								
	Management & Entrepreneurship								
Total								**658**	**65.8**

Semester 7 and 8 – Year 4 (Junior Rotation)									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (25%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (40%)**	**Total (Hrs) (100%)**	**Credits**
	Psychiatry and Mental Health								
	Anaesthesiology and Critical care Medicine								
	Ophthalmology								
	Emergency Medicine								
	Surgery								
	Internal Medicine								
	Obstetrics and Gynaecology								
	Paediatrics and Child Health								
	Otorhinolaryngology								
	Orthopaedics, Traumatology and Neurosurgery								
Total								**1310**	**131.0**

Semester 9 and 10 – year 5 (Senior Rotation)									
Course Code	**Course name**	**Core or elective**	**Lecture (Hrs) (25%)**	**Tutorial/ Seminar (Hrs) (15%)**	**Assignment (Hrs) (10%)**	**Ind. Study (Hrs) (10%)**	**Practical (Hrs) (40%)**	**Total (Hrs) (100%)**	**Credits**
	General surgery								
	Obstetrics and Gynaecology								
	Paediatrics and Child Health								
	Internal Medicine								
	Community Health								
	Research Data analysis and Reporting								
Total								**1316**	**131.6**

Appendix 4: Example of MD/MBBS/MBChB Programme Milestones

Competency Domain 1: Professional Knowledge

Sub-domain	Semester 2-6	Semester 8-10
Knowledge of fundamental Biomedical sciences	Applies knowledge of biomedical sciences and health determinants to solve papers cases of patients with health issues	Integrates knowledge of biomedical sciences and health determinants in the care and management of patients
Knowledge of prevention and control of diseases	Describes health care strategies to prevent diseases and manage patients	Apply health care strategies to prevent and manage various diseases.
Clinical reasoning	Describes the role of clinical reasoning in management diseases	Demonstrates clinical reasoning in the management of diseases.

Competency Domain 2: Practical/Clinical Skills

Sub-domain	Semester 5 – 8	Semester 9/10
History taking and physical examination	Synthesize relevant features from history and physical examination to make a diagnosis of medical conditions	Makes appropriate treatment plan for medical conditions
Laboratory investigations and interpretation	Interpret laboratory investigations	Interpret investigation results for rational treatment of disease conditions
Diagnostic skills	Formulate final diagnosis based on patient history, physical examination findings and lab results	Appraises final diagnosis based on patient history, physical examination findings and lab results if it is appropriate for disease conditions
Patients' management	Describes current therapeutic methods to manage disease conditions	Use evidence-based knowledge of therapeutics to manage and plan appropriate treatment for diseases
Records and presentation ability	Describes in a portfolio managed patient	Uses a portfolio to record managed disease cases
Multidisciplinary approach to patients' care	Describes teamwork in management of diseases	Ask for assistance from team members to make and implement patient care plans

Competency Domain 3: Relationships with Patients, Clients and Communities

Sub-domain	Semester 2-4	Semester 5-6	Semester 7/8	Semester 9/10
Communication with patients, clients, and communities	Demonstrate ability to communicate professionally in the classroom.	Take history of patients/clients with various problems in the health care setting.	Communicate as part of a health care team to facilitate the care of the patient/client in various health care settings and the community.	Establish constructive (therapeutic/professional) relationships with clients and or communities to address their health needs and preferences
Provision of counselling	Describe approaches used during counselling	Apply principles of counselling in providing counselling to clients		Provide counselling for health and health-related issues.
Service provision	Demonstrate professional communication in the classroom.	Designs simple health promotion materials	Demonstrate competent communication with community leaders and members about community issues.	Provide health services to individuals and groups that are appropriate to their different backgrounds.

Competency Domain 4: Communication Skills

Sub-domain	Semester 2-6	Semester 7/8	Semester 9/10
Preparation of effective health promotion messages	Prepare and present health /medical topics in a departmental forum or class	Prepare preventive messages for medical disorders for health professionals and communities.	Prepare health messages for Regional and International health for government agencies and the public.
Teach other health professionals	Teach allied health workers and junior medical students' simple topics	Teach senior medical students and colleagues on various health topics	Teach varied disciplines and at upper levels of health cadres on complicated health topics.

Competency Domain 5: Intra and inter-professional practice and collaboration

Sub-domain	Semester 2- 6	Semester 7/8	Semester 9/10
Working effectively with colleagues	Demonstrate effective participation in group work activities with colleagues, including community field activities	Demonstrate respect and teamwork with colleagues, seniors, and healthcare workers of all cadres	Interact with professionals in other disciplines and agencies targeting the care of patients
Contribution to teamwork	Describes principles of teamwork	Lead and guide junior team members in the care of patients	Demonstrate effective hand-over procedures and clear communications with colleagues to ensure the continuing good medical care
Demonstrate the ability to listen and take advice from colleagues.	Follows instruction carefully and competently.	Demonstrate command of respect from colleagues, juniors and seniors wherever allocated.	Demonstrate the ability to seek advice from multidisciplinary colleagues and appropriately use this for improvement of care

Competence domain 6: Maintaining Good Practice

Sub-domain	Semester 2	Semester 4	Semester 7/8	Semester 9/10
Evaluation of one's performance and practice	Evaluate self and peer performance in a classroom setting	Self-evaluate practice with instructor feedback.	Self-evaluate his/her clinical practice.	Systematically evaluate one's performance and practice (reflective practice) and implements required change
Seeking information necessary to improve practice	Utilize library and ICT resources	Employ patients/clients' suggestions, and government documents	Demonstrate ability to use peer review literature and relevant community-level resources and experts.	Regularly seek information necessary to improve professional practice (life-long learning)
Evidence-	Appraise	Evaluate	Utilize	Apply evidence

Sub-domain	Semester 2	Semester 4	Semester 7/8	Semester 9/10
based decision making	health care delivery system in the context of development paradigms	strengths, weaknesses and make suggestions to Staff and facilities based on experience in a facility.	research findings appropriately to inform clinical decisions.	in decision making in the management and care of clients
Formative evaluation	Describe approaches of providing formative evaluation	Accept formative evaluation and feedback to improve practice		Incorporate constructive evaluation feedback into daily work practice
Leadership and managerial skills	Demonstrate ability to run a group work meeting	Provide constructive feedback to peers and instructors.	Show ability to order, store, and distribute supplies and keep inventory.	Apply leadership and managerial skills in work practice
Use of Information Technology	Demonstrate basic ICT skills, including typing.	Apply ICT skills for university assignments.	Apply ICT skills in managing patient data and planning care, and for research, use of HINARI.	Use information technology to optimize learning, health care delivery and education
Accreditation, monitoring, evaluation, and audit	Describe accreditation, monitoring, evaluation, and audit process used to improve quality care	Apply principles of accreditation, monitoring, evaluation, and audit process to improve quality care in health care delivery		Promote accreditation, monitoring, evaluation, and audit to provide quality care in health and health-related services.
Priority setting and time management	Describe approaches used for priority setting and	Practice priority setting and time management in health care services		Set priorities and manage time to balance professional responsibilities,

Sub-domain	Semester 2	Semester 4	Semester 7/8	Semester 9/10
	time management in health care services			outside activities and personal life

Competency Domain 7: Working Within the System and Context of Health Care

Sub-domain	Semester 2	Semester 4	Semester 7/8	Semester 9/10
Health care system functions and structure	Discuss the interrelationships between university, health care settings and government.	Analyzes health delivery systems in the context of current development trends.	Describes the role of health care policies	Demonstrate knowledge of how the health care system functions (structures, policies, regulations, standards, and guidelines)
Working in different health care setting and systems	Work effectively in the classroom.	Work effectively in hospitals and clinics.	Work effectively in the community.	Practice effectively in various health care delivery settings and systems (hospitals, ministries, NGO's, communities, industry).
Leadership and management of the health system	Describe leadership and management skills and process as applied in the health system	Apply leadership and management skills in planning, coordinate, implement, monitoring and evaluating health service delivery and health interventions within the health care system.		Demonstrate leadership skills in managing health care delivery within the healthcare system.
Cost-effectiveness of health care	Discuss economic crisis and structural adjustment and aid programmes	Recognize considerations of cost-effectiveness in the health system and	Demonstrate cost-effectiveness in budgeting	Employ principles and strategies of cost-effectiveness into health

Sub-domain	Semester 2	Semester 4	Semester 7/8	Semester 9/10
		community.		service delivery.
Promotion of quality care through audits, accreditations, and evaluations	Demonstrate knowledge of the importance of audits and accreditation \	Evaluate the role of audits, accreditations, and evaluations of health care facilities.		Promote quality care in health systems through audits, accreditations and or evaluations.
Identification of system challenges, errors, and solutions	Examine the links between social and political developments and health in Africa.	Describe principles of good governance in the health care system.	Points of possible solutions to challenges, errors in health care systems	Report / errors health care system challenges when delivering health care services
Entrepreneurial skills	Describe the concept of entrepreneurship as applied in the health profession	Consider principles of entrepreneurship in advancing practice and profession		Apply entrepreneurial skills for the advancement of the practice and the profession

Competency Domain 8: Professionalism

Sub-domain	Semester 2	Semester 6	Semester 7/8	Semester 9/10
Maintenance of ethical standards in patient care	Describe implications of ethical principles and values which govern the practice of health professionals.	Describe the codes, regulations and standards which govern the practice of medicine.	Obtains appropriate informed consent/ assent appropriately	Maintain professional, ethical standards including but not limited to confidentiality, informed consent, practice errors, avoid conflicts of interest)

Sub-domain	Semester 2	Semester 6	Semester 7/8	Semester 9/10
Sensitivity and responsiveness to diversity	Demonstrate appropriate communication skills with students of different backgrounds	Demonstrate increasing level sensitivity and responsiveness to patient's religion, culture, age, gender, and disabilities		Demonstrates sensitivity and responsiveness to diversity including but not limited to culture, age, socioeconomic status, gender, religion, and disability) when dealing with clients
Respect compassion and integrity	Describe ethical care of the individual by health care providers.	Demonstrates increasing level respect, compassion, accountability, dependability, and integrity when interacting with peers, other health professionals, patients, and their families		Demonstrates respect, compassion, accountability, dependability, and integrity when interacting with peers, other health professionals, patients, and their families
Professional accountability	Describe accountability measures applied in the provision of health care services	Apply accountability measures when providing services to the patients and community		Demonstrate accountability to patients, society and the profession when providing health care services.

Competency Domain 9: Scientific Inquiry and Critical thinking

Sub-domain	Semester 2	Semester 3-6	Semester 7/8	Semester 9/10
Adherence to the scientific inquiry procedure	Describe the concept of scientific inquiry	Applies scientific inquiry procedures in solving problems		Adhere to scientific inquiry procedures in solving problems.
Applied research	Discusses the value of evidence-based medical	Applies statistical	Writes a research	Applies appropriate

Sub-domain	Semester 2	Semester 3-6	Semester 7/8	Semester 9/10
activities	practice.	research concepts.	proposal using peer-reviewed literature.	research methods to conduct scientific inquiry
Critiquing clinical and research findings	Describe steps for critiquing clinical and research findings	Analyses research evidence for its strength and weakness		Evaluates the strength and/or weaknesses of clinical and research findings.
Defending scientific arguments/ clinical findings	Describes steps for defending scientific arguments/ clinical findings	Engages in discussion for research/clinical findings		Defends scientific arguments/ clinical findings
Clinical reasoning	Describes steps for developing clinical reasoning	Practice clinical reasoning approaches in solving problems during clinical practices		Applies clinical reasoning to solve health and health-related problems.
Analysis of new Knowledge and evidence	Describes steps for conducting a critical analysis of new knowledge and evidence	Practice critical thinking during reviewing clinical guidelines and new research evidence		Analyzes new knowledge, guidelines, standards, technologies, products, or services that have been demonstrated to improve outcomes
Scientific inquiry process	Identifies a researchable problem of public health or clinical relevance	Accurately documents, analyses, and disseminates research, quality improvement and evaluation findings		Accurately documents, analyses disseminate research
Provide scientific	Perform analyses of data using sound statistical/epidemiological	Critique research and information to support sound		Critique research and information to support sound

Sub-domain	Semester 2	Semester 3-6	Semester 7/8	Semester 9/10
evidence	methods	decision making		decision making
Critical thinking	Adopts a questioning and critical approach in all aspects of research and practice	Applies problem-solving skills to create realistic solutions to health problems or issues		Applies problem-solving skills to create realistic solutions to health problems or issues

Appendix 5: List of Minimum Practical and Procedural Skills for Medical Graduates.

(a) List of Minimum Diagnostic Skills

History taking, physical examination and preliminary tests

1. General History taking,
2. Physical examination,
3. Perform physical examination of lymph nodes
4. Perform physical examination of the spleen.
5. Elicit different types of tenderness (direct, rebound)
6. Perform Umbilical cord exam (newborn)
7. Perform hepatic, splenic & renal examinations
8. Perform examination of Hernia
9. Documenting of findings
10. Measure baseline physiological parameters
11. Interpret enzymatic and biochemical results of various pathologic conditions.

Cardiovascular system

12. Perform placement of cardiac monitor leads
13. Perform and interpret ECG
14. Interpret the findings of echocardiography
15. Request for and interpret Chest and x-rays
16. Central Venous Pressure interpretation.
17. Perform simple echocardiographic technique &interpretation
18. Lipid test profile interpretation
19. Basic cardiac catheter interpretation

Endocrine

20. Do a thyroid examination
21. Interpret thyroid test results
22. Do a testicular examination.
23. Identify abnormal sexual characteristics (Tuner's staging, gender, developmental disorders)
24. Perform and interprets Diabetes tests
25. Measure capillary blood glucose

Gastrointestinal and Hepatobiliary Tracts

26. Perform examination of the mouth & throat (incl. teeth, tongue, & salivary glands & ducts).
27. Perform abdominal examination (inspection, auscultation, percussion, palpation)
28. Requests the various GIT tests
29. Identify patterns of abdominal distention
30. Perform a digital rectal examination (DRE)
31. Demonstrate ascites and perform tapping.
32. Perform asterixis technique
33. Perform stool guaiac tests
34. Perform stool examination for white blood cells.
35. Request and Interpret Liver function tests

36. Interpret pancreatic tests
37. Request and interpret plain Abdominal x-rays
38. Interpret barium swallow results.
39. Interpret abdominal ultrasound results
40. Request and interpret endoscopic results

Hematological

41. Obtain and make a peripheral blood-smear
42. Obtain blood and do Hematocrit tests.
43. Interpret red cell morphology
44. Interpret white blood cell morphology
45. Interpret sedimentation rates.
46. Request and interpret test for anemias.
47. Request Blood grouping & cross-matching
48. Perform test for bleeding and prothrombin time
49. Request and interpret bleeding time
50. Request and interpret prothrombin time

Skin and appendages

51. Describe and demonstrate skin quality (color, temp, texture, moisture).
52. Identify and interpret skin pigmentation patterns
53. Assess skin lesion qualities (petechiae, urticarial, jaundice vesicles, etc.)
54. Assess and interpret hair quality & distribution patterns.
55. Describe and identify various nail appearances and patterns
56. Identify skin and appendages signs of infection
57. Identify skin and nails signs of smoking
58. Identifying skin signs of substance abuse
59. Identify subcutaneous emphysema.
60. Identify and describe the various lesions of skin appendages
61. Quantify burn injury

Musculoskeletal system (MSS)

62. Perform shoulder examination
63. Perform upper and lower extremities examination
64. Perform neck examination (incl. scoliosis, disc maneuvers)
65. Perform hip examination (incl. neonatal)
66. Perform knee examination (incl. maneuvers)
67. Perform ankle fracture assessment (incl. fracture rules)
68. Request Musculo-skeletal X-rays
69. Interpret Limb x-rays (incl. epiphyses)
70. Interpret back x-ray
71. interpret pelvic X-rays.
72. Request and interpret skull x-rays
73. Perform joint fluid aspirations
74. Examine and interpret Joint fluid aspirates
75. Request and interpret pelvic Ultrasound
76. Perform a bone mineral density test and interpretation

77. Request for and interpret basic MSS CT Scan and MRI results

Neurological and nervous system

78. Assess and determine altered levels of consciousness (level of arousal, response to auditory stimuli, response to visual stimuli, response to noxious stimuli).
79. Assess speech and language function (fluency, comprehension repetition, and naming).
80. Assess and determine short term and long-term memory status.
81. Assess and determine visuospatial processing.
82. Examine and identify cranial nerves dysfunction.
83. Perform ophthalmoscopic examination of fundi & retinae (color, vasculature, AV, crossings, cup, ocular venous pulsations) and interpret the results.
84. Perform pupillary examination and interpret the results.
85. Identify and interpret Extra ocular movements.
86. Assess and interpret facial sensations.
87. Determine facial muscle strengths.
88. Demonstrate and interpret palatal movements.
89. Assess neck movements head, rotation, shoulder elevation).
90. Assess tongue movements.
91. Assess and interpret gaits/station (casual gait; toe; heel, and tandem walking, Romberg's)
92. Assess and determine coordination abnormalities (fine finger movement, rapid alternating movements, finger-to-nose test, heel-to-shin, involuntary movements).
93. Assess and demonstrate the pronator drift.
94. Assess and demonstrate muscle tone, bulk, strength.
95. Perform sensation and light touch assessments.
96. Assess and determine pain and temperature thresholds.
97. Assess vibration.
98. Assess proprioception.
99. Elicit and interpret deep tendon reflexes.
100. Elicit and interpret plantar responses.
101. Demonstrate and interpret primitive reflexes (neonatal)
102. Demonstrate and interpret frontal release signs.
103. Perform an autonomic examination (e.g., skin temp & moisture, orthostasis, BP & pulse with Valsava maneuver)
104. Perform and interpret nuchal rigidity and maneuvers.
105. Assess and determine development milestones (pediatrics).
106. Perform and interpret fontanel examination (neonate).
107. Perform selected cranial nerves assessment (response to visual threat,

pupillary light reflex, oculocephalic reflex, VOR, cornea reflex, gag reflex).
108. Interpret basic CTI, MRI results of the CNS.
109. Interpret CS fluid appearance and request biochemical, culture and biological tests, and interpret the results.
110. Determine indications, request, and interpret EEG results for nervous system conditions.

Mental Health

111. Perform physic al examination for the mentally ill
112. Perform mental status assessment
113. Request and Interpret an EEG for mental illnesses.
114. Recognize and respond appropriately to difficult patient.
115. Perform anxiety assessment.
116. Perform violence risk assessment.
117. Recognize different types of abuse.
118. Assess and identify eating disorders.
119. Perform mood assessment, including mania and depression.
120. Perform a suicidal risk assessment
121. Perform a psychosis assessment.
122. Perform a somatoform assessment.
123. Perform a substance abuse assessment and identify drug withdrawal signs

Reproductive system

124. Measure respiratory function (spirometry)
125. Perform pregnancy tests and interpret the results
126. Perform a breast examination
127. Perform a pelvic examination with a speculum
128. Perform an adnexal examination
129. Perform a vaginal examination
130. Examine the scrotum, testis, prostate and penis
131. Examine and interpret Fetal heart tones
132. Identify secondary sexual characteristics
133. Perform an obstetric examination
134. Request and interpret PAP smear results
135. Prepare a wet mount and examine
136. Collect Urethra & cervical swabs for culture and other tests
137. Provide family planning methods service to patients
138. Monitor labor using partograph.
139. Request and interpret pelvic US findings

Respiratory system

140. Identify interpret nasal flaring (pediatrics)
141. Preform examination of the nose using a speculum
142. Perform examination of the nasal sinuses
143. Perform examination of the nasal openings, turbinates' septum, and the mucosa.

144. Perform thoracic examination (shape, movements, diameter, ribs, diaphragm) and interpret the results.
145. Carry out a physical examination of the chest (percussion, fremitus, auscultation & qualities of air sounds, lobar locations)
146. Perform examination of the Respiratory muscle movements.
147. Recognize stridor
148. Identify cough patterns
149. Perform throat swab for SARS COV 2 PCR tests.
150. Perform and interpret peak airflow measurements
151. Carry-out basic spirometry (vital capacity, FEV1), and interpret results.
152. Interpret arterial blood gas results
153. Perform oximetry and interpret results
154. Perform Oxygen desaturation testing and interpret the results
155. Perform Mirror examination of retro pharynx
156. Request, chest x-ray and interpret the results.
157. Interpret pleural fluid appearance.
158. Request tests on pleural aspirates and interpret the results
159. Interpret V/Q scan

The Ear, Nose and Throat.

160. Perform nasal packing
161. Perform cerumen removal
162. Perform hearing assessment
163. Perform Ear anatomy examination (incl otoscope)
164. Perform a comprehensive head and neck examination.
165. Assess and interpret tympanic membrane mobility (pneumotoscopy)
166. Perform complete Cranial Nerve VII assessment and interpret results.
167. Perform indirect laryngoscopy.
168. Assist flexible laryngoscopy.
169. Observe and interpret and audiogram.
170. Observe myringotomy
171. Assist in orotracheal intubation.
172. Asist and perform tracheotomy tube change
173. Identify structures on nasal endoscopy

The Eye

174. Request and interpret visual field tests
175. Request and perform visual field acuity
176. Examine the external eye anatomy
177. Examine the cornea & anterior chamber
178. Examine the disc (color, edges, size & shape)
179. Perform color vision testing
180. Perform upper lid retraction
181. Carry out amblyopia screening
182. Perform tonometry
183. Carry out a fluorescein corneal staining

184. Remove simple eye foreign bodies.

Renal/Urinary system

185. Perform bladder examination
186. Request, perform and interpret Renal Function Tests
187. Request PSA and interpret results
188. Perform a Costovertebral angle (CVA)-renal angle location & tenderness test
189. Perform Prostate examination
190. Perform a Clean-catch urine technique
191. Perform a Urinalysis (dipstick & microscopic)
192. Take a urethral swab for tests and culture
193. Carry out a urine multi-dipstick test
194. Request and interpret a plain Abdominal film (KUB)

Laboratory diagnostics tests

195. Perform a biopsy, preserve, and transport it to the Lab appropriately.
196. Request and make Gram stains and interpret results
197. Make a sputum acid-fast bacilli test and interpret results.
198. Request and take various types of sputum cultures
199. Culture sputum for various tests requested.
200. Interpret sputum culture results
201. Request and perform blood toxicology screening (incl. alcohol)
202. Make Fluid/electrolytes test interpretation
203. Request testing and interpret HIV test results
204. Perform KOH examination & interpretation

(b) Minimum Procedural skills

Safety and Circulation Maintenance Procedures

1. Correctly apply techniques for moving and handling patients including frail ones.
2. Perform scrubbing and put on protective gear for all procedures.
3. Perform Venipuncture (venous cannulation - needle, catheter)
4. Set intra-Venous infusion line
5. Perform Femoral vein cannulation.
6. Perform a cut-down
7. Carry out safe and appropriate blood transfusion

Thoracic/Respiratory

8. Perform a mouth to mask ventilation.
9. Perform Laryngoscopy/tracheal tube placement to establish airway.
10. Administer Oxygen using a face mask
11. Perform basic airway management (suction, clearance, bagging).
12. Monitor airway suction
13. Perform cricothyroid membrane puncture.
14. Assist chest tube insertion.
15. Manage chest drainage
16. Perform basic spirometry.
17. Perform Peak flow measurements

18. Perform needle decompression of tension pneumothorax
19. Perform pleural aspiration
20. Perform Intercostal injection technique.

Cardiovascular

21. Perform basic Cardiopulmonary life support (CPR) for children
22. Perform basic Cardiopulmonary life support (CPR) for adults.
23. Set up and record a 12-lead ECG
24. Perform Cardiac defibrillation.
25. Perform Advanced Cardiac Life Support (ACLS).
26. Perform pericardiocentesis.

GIT

27. Insert a naso-gastric tube (NGT)
28. Insert an oral-gastric tube (OGT)
29. Drain a perianal hematoma.
30. Drain a perianal abscess
31. Perform a proctoscopy.

Pathology/Diagnostic

32. Perform Finger stick puncture technique
33. Perform fine needle aspiration (FNA)
34. Instruct patients how to take swabs from the various sites
35. Take cervical swab for culture.
36. Perform Postnasal swab for Highly infectious organisms.
37. Request and take blood culture samples.
38. Take a skin scraping for cells & organisms.
39. Take wound swabs.
40. Take throat swabs
41. Take skin scrapings for fungal tests

Ear, Nose and Throat

42. Perform external ear syringing
43. Remove Ear wax
44. Remove foreign body from external auditory meatus.
45. Remove foreign body from the nostril.
46. Take throat culture swabs
47. Perform Mirror examination of retro pharynx.
48. Perform anterior Nasal packing
49. Perform posterior Nasal packing

Obstetrics and Gynecological

50. Monitor labour using partograph.
51. Perform normal vaginal delivery.
52. Assist in abnormal vaginal delivery
53. Assist C-section & MVA.
54. Collect and prepare a PAP smear correctly.
55. Take high Vaginal Swab
56. Remove Intra-Uterine Devices (IUD).
57. Fit and insert diaphragm.

Urogenital

58. Carry out male and female urinary catheterisation (adults)
59. Carry out male and female urethral catheterization (Children)

60. Perform emergency suprapubic cystostomy (adults)
61. Perform suprapubic aspiration (Children).
62. Do urinary bladder catheter maintenance (incl. infection surveillance).
63. Take male and female urethral swabs.

Nervous System

64. Perform lumbar puncture and obtain CSF Fluid.
65. Administer local anesthesia
66. Carry-out a digital nerve block.

Ophthalmology

67. Apply an eye patch
68. Remove a corneal foreign body
69. Perform eye irrigation
70. Use a slit lamp.

Musculoskeletal

71. Perform Subcutaneous and intramuscular injections.
72. Perform intradermal injection
73. Perform intramuscular injection.
74. Carry out skin anesthesia technique
75. Apply sling to upper extremity
76. Apply back-slab to the forearm.
77. Apply below knee back slab
78. Apply a full-arm cast
79. Apply forearm cast
80. Apply full-leg cast
81. Apply a walking heel to a plaster
82. Apply a below-knee cast
83. Apply a finger splint
84. Apply a cervical color.
85. Remove plasters and casts.
86. Reduce a dislocated finger
87. Reduce a dislocated shoulder
88. Reduce a dislocated head of radius
89. Reduce a dislocated head of femur.
90. Reduce a dislocated patellar
91. Perform wound care and basic wound closure and dressing
92. Perform a skin biopsy & closure technique
93. Take a biopsy from palpable skin lesions
94. Do soft tissue injury strapping.
95. Perform injection of Tennis elbow.
96. Preform injection of trochanteric bursa.
97. Inject and aspirate an olecranon bursa
98. Inject and aspirate a pre-patellar bursa
99. Inject a plantar fasciitis.
100. Perform Joint aspirations
101. Reduce a dislocated temporal-mandibular joint

(c) Minimum therapeutic skills

1. Instruct patients in the use of inhalation devices
2. Insulin injection
3. Set-up Oxygen administration equipment.
4. Administer Nebulisation therapy.
5. Administer eye drops and ointments
6. Prescribe and administer oxygen therapy
7. Prepare and administer injectable drugs
8. Perform aseptic/sterile techniques
9. Put on gowns & perform scrubbing for surgery
10. Administer blood components
11. Administer various injections.
12. Prepare dosages of the common medications.
13. Write prescriptions (incl.-controlled drugs)
14. Perform various needle & syringe techniques
15. Administer various IV infusion systems (lines, fluids, connectors)
16. Perform various suturing techniques
17. Perform various surgical knot-tying
18. Remove sutures and staples
19. Perform incision and drainage techniques
20. Control gross external haemorrhage
21. Carry-out universal precautions (infectious disease)
22. Perform general wound care technique
23. Perform simple wound debridement.
24. Move the injured patient correctly
25. Apply patient restraint technique
26. Administer and manage immunizations.
27. Administer Nutritional Therapies
28. Prescribe and administer oral inhalation medicine

(d) Minimum Administrative skills

1. Order hospital admission
2. Record hospital progress notes
3. Write hospital discharge
4. Write hospital transfer
5. Manage community health resources
6. Manage consultations
7. Obtain informed consent for procedures
8. Utilize patient education materials
9. Utilize medical records
10. Utilize systems of medical practice problem management
11. Certify death and write death certificate
12. Fill PF3 and be familiar with Postmortem certificate
13. Participate in pharmacovigilance, hemovigilance, and blood forms
14. Prepare a medical report.