

# **A Conceptual Developmental Framework for the First year Biokinetics Practical Programme**

Yvonne Paul

Master's thesis  
Degree Programme in Education  
Management  
2021



<b>Author(s)</b> Yvonne Paul Joseph	
<b>Specialisation</b> Degree Programme in Education Management	
<b>Thesis title</b> <b>A Conceptual Developmental Framework for the First year Biokinetics Practical Programme at Tshwane University of Technology (TUT)</b>	<b>Number of pages + number of appendices</b> 42 + 5
<p>Introduction: Biokinetics training institutions in South Africa do not follow a uniform degree model; some offer the old 3-year undergraduate degree coupled with a one-year honours degree (“3+1”) model whilst other universities in South African have adopted the new four-year professional degree model. The differences in these models call into question the quality of clinical internship experiential learning. The Biokinetics Association of South Africa (BASA) and the Health Professionals Council of South Africa (HPCSA) have recommended that all South African Biokinetic training institutions adopt the four-year professional programme, which should consist of the same module content, module descriptors, and clinical internship structure in order to maintain uniform quality. The aim of this study is to develop a framework for practicals in the Biokinetics programme with a spreadsheet quota, elaborating the apportionment and the hours to be spent on each subject in year 1 of the degree, and to create an implementation plan for work integrated learning which will be referred to as Biokinetics Practice 1 and which will form part of the Biokinetics module for 1<sup>st</sup> year students within the 4-year professional degree in Biokinetics at the Tshwane University of Technology (TUT). This will ensure that the proposed framework and articulation adhere to the standards laid out by BASA and the HPCSA.</p> <p>The objective of this project is to develop a conceptual developmental framework on specific acquisition of various competencies adopted by the learners in the Biokinetics Practise 1 module. The module will focus on horizontal articulation wherein contents and vertical articulation amongst different studying year levels and its association with the components to be taught.</p> <p>Methods: The Biokinetics Practise 1 module framework was developed in order to prepare the student and test their competencies in managing a private or public Biokinetics practice or health care facility guided by the minimum standards laid out by the Health Professionals Council of South Africa (HPCSA). Conclusion: Biokinetics</p>	

Practise 1 will prepare students with foundational knowledge, skills, and values, ensuring that they are competent in the application of specialised practical knowledge and skills related to all aspects of Biokinetics; translating theoretical and practical knowledge, skills, and values developed in a controlled environment into the uncontrolled working context.

**Keywords**

Biokinetics, work integrated learning, curriculum development, higher education, rehabilitation, and health promotion

## Contents

Abbreviations .....	iii
Key Concepts .....	iv
Table of Figures.....	v
List of Tables .....	vi
1 Introduction .....	1
1.1 Structure of the Thesis .....	3
2. Objectives .....	4
3 Theoretical Perspective and Insight into the Biokinetics Profession .....	7
Theories associated with the Study.....	7
3.1 Bernstein’s Theory of Pedagogy .....	7
3.2 Bernstein Theory and Association to the Curriculum Development Model.....	9
3.3 Bernstein Theory in Relation to other Theorists Viewpoint.....	11
3.4 Biokinetics Programme at TUT .....	14
4 Methodology: Development of the First Year Biokinetics Practical Module (Biokinetics Practice 1) Using the Four Essential Phases of the Curriculum Development Process ....	16
4.1 Aim.....	16
4.2 The Research Design.....	16
4.2.1 Research Methodology .....	16
5 Development of the First Year Biokinetics Practical Module (Biokinetics Practice 1) Using the Four Essential Phases of the Curriculum Development Process.....	18
5.1 Phase 1 (Planning).....	18
5.1.1 Identify the issue .....	18
5.1.2 Formation of curriculum development team.....	19
5.1.3 Conduct Needs Assessment and Analysis .....	19
5.2 Phase II (Content and Methods).....	21
5.2.1 Intended Outcome.....	21
5.2.2 Select Content .....	24
5.2.4 Design Experiential Learning Methods .....	28
5.3 Phase III (Implementatio .....	30
5.3.1 Produce Curriculum Product .....	30
5.3.2 Test and Revise Curriculum .....	31
5.3.3 Recruit and Train Facilitators.....	31
5.3.4 Implementation of the Curriculum.....	32
5.4 Phase IV (Evaluation).....	32
Evaluation Strategy.....	33
Evaluation Plan .....	33

6 Conclusion and Recommendations.....	35
6.1 Recommendation for Future Research.....	36
6.2 Reflection on own Learning.....	37
References .....	39
Appendices.....	43
Appendix 1: Health Professions Council of South Africa, Professional Board for Physiotherapy, Podiatry and Biokinetics: Minimum Standards for the training: Biokinetics.....	44
Appendix 2: Example WIL Examination.....	63
Appendix 3: Module Descriptor for Biokinetics Practice 1.....	64
Appendix 4: Module Design Biokinetics Practise 1.....	65
Appendix 5: The South African Qualifications Authority, Level Descriptors for the South African National Qualifications Framework.....	66

## **Abbreviations**

BASA: Biokinetics association of South Africa

HEI: Higher Education Institutions

HEQSF: Higher Education Qualification Sub-Framework

HPCSA: Health Professionals Council of South Africa

LIU: Learning Input Units

LMS: Learning Management System

MRC: Medical Research Council

NQF: National Qualification framework

SAAB: South African Association of Biokinetics

SAQA: South African Qualifications Authority

TUT: Tshwane University of Technology

TVET: Technical Vocational Education and Training (TVET) College

WIL: Work Integrated Learning

## Key Concepts

Biokinetics:	An exercise-based therapy, which plays a major role in the final-phase of rehabilitation, facilitating and enhancing an individual's capacity to return to their functional based activities.
Fortogenic	Health paradigm focusing on health and wellness campaigns.
Pathogenic:	Health paradigm focusing on non-communicable diseases and orthopaedic pathology.
Student centred:	Orientated with the best needs of the student in mind, taking their needs into account in order to favour learning, enhancing student participation as active participants in their learning.
Vocational:	As relating to an occupation or to employment.
Work Integrated Learning:	Learning through practical exposure and experience in the clinic laboratory and in the workplace thereby enhancing student employability upon graduation.

## Table of Figures

Figure 1: Biokinetics Practise Module Development (based on the Curriculum Development Model by Wentling, Lai, Khor, Mohamed, Escalada, Teoh 1993).....	6
Figure 2: Vocational and Professional curricula (Adapted from Barnett, 2006).....	8
Figure 3: Wentling’s guide to curriculum development (Wentling et al 1993).....	17
Figure 4: Planning: First Phase of the Curriculum development Plan .....	18
Figure 5: Contents and Methods: Second phase of the Curriculum Development Plan.....	21
Figure 6: The Experiential Learning Cycle Facilitator Guide, Curriculum Development for Issues Programming (USDA.1992).....	28
Figure 7: Implementation: Third phase of the Curriculum Development Plan.....	30
Figure 8: Evaluation: Fourth phase of the Curriculum Development Plan.....	32



## List of Tables

Table 1: Module Design for Biokinetics Practicals 1.....	2
Table 2: Mapping of the Practical Undertaken in Year 1 of Biokinetics.....	20
Table 3: Intended Outcomes (educational objectives).....	22-23
Table 4: Learning Outcome 1.....	25-26
Table 5: Learning Unit 2.....	26
Table 6: Necessary knowledge required to ensure the intended outcome.....	27
Table 7: Assessment Plan.....	33-34

## 1 Introduction

Biokinetics is an exercise-based therapy, which plays a major role in the final-phase of rehabilitation, facilitating and enhancing an individual's capacity to return to their functional based activities in ADL (Active Daily Living) (Ellapen & Swanepoel, 2017). Using clinical exercise and recreational sporting activities, biokineticists strive to enthusiastically (and cautiously) guide patients through the prescribed physical activities, without neuro-muscular and/or cardiorespiratory inhibitions. The fundamental areas of Biokinetic rehabilitation involve non-communicable diseases, orthopaedic pathology, and health and wellness campaigns. These three areas are articulated within the pathogenic (non-communicable diseases and orthopaedic pathology) and fortogenic (health and wellness campaigns) healthcare paradigms (Ellapen & Swanepoel 2017; Strydom 2005).

With the registration of Biokinetics as a qualification by the HPCSA on the 9th of September 1983, the South African universities offering the programme adopted the 3+1 model, i.e. a three year junior degree and a one year honours qualification in Biokinetics. However, in so far as the 3+1 model did not allow for adequate exposure and preparation of Biokinetics students for clinical practice, the four-year professional model was adopted. The primary benefits of the new four-year professional degree are that Biokinetics students-in-training are exposed to clinical work integrated learning during their first year of study. That is to say that one of the foundational elements of the four-year professional degree is the manner in which work integrated learning has been stratified into the specialization. In the traditional "three plus one (3+1)" model, students-in-training began their Biokinetics clinical work integrated learning during their postgraduate (fourth) year of study and then continued with a second year clinical Biokinetics internship following the completion of their postgraduate degree. Students complying with the "three plus one" model are afforded two years of clinical worked integrated learning whereas the new four-year professional degree allows the student to benefit from clinical work integrated learning from their first year of study, thereby allowing them to accumulate a total of four years of Biokinetics clinical experiential learning by the end of their degree (Grobler et al. 2021).

The Tshwane University of Technology (TUT) started the process of re-designing the pre-existing Biokinetics curriculum (3 + 1) to a professional four degree, with the revision of the professional curriculum beginning in 2017. Restructured as a four-year professional degree, the new Biokinetics curriculum has been fully developed and implementation began in 2020. Similar restructurings of the Biokinetics curriculum at other South African universities have, however, been delayed, awaiting the finalisation of the minimum

standards required by the HPCSA. Following the restructuring of the Biokinetics curriculum at TUT, The Health Professions Council of South Africa gazetted an updated Biokinetics higher education minimum standard guide in 2020. As a result, TUT has not fully complied with the most recent guidelines. In so far as the HPCSA minimum standard guide has been finalized, TUT is required to comply with the published guide and thus alter its approved Biokinetics curriculum (Appendix 1). This is particularly necessary as concerns the lack of consistency in the implementation phase (work integrated learning).

One of the key features in the Biokinetics programme is known as Work Integrated Learning (WIL), and this gives students practical exposure and experience in the clinic laboratory and in the workplace (Biokinetics practices), thereby enhancing their employability upon graduation. Worked integrated learning involves the practical application of theoretical modules such as Clinical Exercise Physiology and Neuro-musculoskeletal Rehabilitation. The module units were identified in articulation with the purpose statement, the module outcomes and the scope of practice as indicated in table 1 below and appear in detail in chapter 5 (which concerns the methodology of the study).

MODULE DESIGN - WIL																										
MODULE	Biokinetics Practice I										CODE	REMARKS	CR	10	HRS	100										
LEARNING IN PRACTICE / WORK BASED LEARNING / INTERNSHIP / LABORATORY WORK																										
NO	DESCRIPTION OF LEARNING UNIT	LEARNING IN PRACTICE UNDER SUPERVISION BY LECTURER										LEARNING IN PRACTICE UNDER SUPERVISION BY TUTOR (WIL)								TOT						
		INSTRUCTION (PR)		PRACTICALS, APPLICATIONS & APPLIED COMPETENCIES UNDER SUPERVISION BY THE LECTURER					ASSESSMENT			TOT	WORK PLACE LEARNING		PRACTICALS, APPLICATIONS & APPLIED COMPETENCIES UNDER SUPERVISION IN THE WORKPLACE (TUTOR)						ASSESSMENT		TOT			
		HRS/W	2	WEEKS/BLOCKS	TIME	PRACTICALS AND APPLICATIONS	ASSIGNMENTS	LABORATORY WORK	FLEXI TIME (insert comment)	TIME	PREPARATION FOR ASSESSMENT	ASSESSMENT	TIME	TIME WITH LECTURER	HRS/W	TIME	PRACTICALS AND APPLICATIONS	ASSIGNMENTS	LABORATORY WORK		FLEXI TIME (insert comment)	TIME	PREPARATION FOR ASSESSMENT	ASSESSMENT	TIME	TIME WITH TUTOR
1	Conducting preparticipation health screening among apparently health individuals	10	20,0	3,0		2,0		5,0			0,0	25,0		0,0						0,0			0,0	0,0	0,0	25,0
2	Physical fitness testing and health assessment	10	20,0	3,0		2,0		5,0			0,0	25,0		0,0						0,0			0,0	0,0	0,0	25,0
3	Interpretation, prescription and monitoring of individualized exercise Program	10	20,0	2,0		2,0		4,0			0,0	24,0		0,0						0,0			0,0	0,0	0,0	24,0
4			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
5			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
6			0,0					0,0	2,0	1,0	3,0	3,0		0,0						0,0			0,0	0,0	0,0	3,0
7	Case Presentation 1		0,0					0,0	2,0	1,0	3,0	3,0		0,0						0,0			0,0	0,0	0,0	3,0
8	Case Presentation 2		0,0					0,0	2,0	1,0	3,0	3,0		0,0						0,0			0,0	0,0	0,0	3,0
9	Case Presentation 3		0,0					0,0	2,0	1,0	3,0	3,0		0,0						0,0			0,0	0,0	0,0	3,0
10	Case Presentation 4		0,0					0,0	2,0	1,0	3,0	3,0		0,0						0,0			0,0	0,0	0,0	3,0
11	Portfolio of evidence		0,0					0,0	4,0	1,0	5,0	5,0		0,0						0,0			0,0	0,0	0,0	5,0
12	Practical Examination		0,0					0,0	4,0	2,0	6,0	6,0		0,0						0,0			0,0	0,0	0,0	6,0
13			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
14			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
15			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
16			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
17			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
18			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
19			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
20			0,0					0,0			0,0	0,0		0,0						0,0			0,0	0,0	0,0	0,0
TOTAL		30	60	8	0	6	0	14,0	18,0	8,0	26,0	100,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100,0

Table 1. Module Design for Biokinetics Practicals 1

Table 1 illustrates the practical components of the 1<sup>st</sup> year curriculum: the practical competencies are detailed in the WIL module (10 WIL credits totalling 100 hours) which takes the proposed restructuring and development of the conceptualised framework for Biokinetics Practical 1 in the Biokinetics programme into account, detailing the spreadsheet quota which elaborates on the apportionment and the hours to be spent on each practical component in year 1 of the degree. This will allow for the creation of an implementation plan for work integrated learning which will better articulate the

implementation of the required theoretical components and provide a framework for further restructuring, allowing further practical components to be integrated into the curriculum.

### 1.1 Structure of the Thesis

This thesis consists of four major sections. Chapter 1 (Introduction) presents the definition, function, and scope of the thesis, especially as regards to the manner in which this influences the Biokinetics programme, introducing the need for redesign of the Biokinetics Practise 1 module. Chapter 2 details objectives and the conceptualised model used for the development of the Biokinetics Practise module 1. Chapter 3 elaborates on theoretical approaches relevant to the phenomenon studied. Chapter 4 describes the research methodology of this study, underlining the research design as well as the conceptualisation of the matrix system. This chapter further marks out the allocation of the quotas and the articulation from one practical to the other so as to efficiently and adequately test competencies. This is achieved through the inclusion of development activities in the programme and models that are used for designing, implementing, and evaluating the various competencies, emphasising the manner in which knowledge is built. Chapter 5 offers a prospective implementation process of the draft module and Chapter 6 consists of the final discussion of the results. The concluding section of the thesis elaborates on the concepts developed in the study, in this chapter the researcher will furthermore detail her own learning experience and challenges.

## 2. Objectives

This chapter describes the nature of the study by providing an overview of the rationale for the study, detailing the background of the new research area, as well as the aim and objectives of the study and the methods that were used. It provides an introduction to the entire mini-thesis, allowing the reader to appreciate the novelty of this study. The theme of the thesis will be the development of an overarching modular framework for Biokinetics Practise 1 (Work Integrated Learning). This will be guided by the Bernstein theory and the Curriculum Development Model (CDM).

The study aims to provide a conceptual developmental framework for the articulation of the Biokinetics Practise 1 (WIL) module as part of the overarching 4-year professional degree. The design of the instructional materials will be guided by the minimum standards set out by the HPCSA (Appendix 1 Biokinetics Minimum standards). At stake in the creation of a conceptual developmental framework is the fact that consistency in the application of WIL modules is essential for all institutions of higher education that offer instruction in Biokinetics as this will increase the credibility of the discipline. Consistent application of the practical WIL modules will ensure that graduates possess a common range of core competencies and skills, together with the accompanying knowledge, underlining their fulfilment of the minimum training standards laid out by BASA and the HPCSA.

The research objectives of this study are:

The objective of this project is to develop a conceptual developmental framework on specific acquisition of various competencies adopted by the learners in the Biokinetics Practise 1 module. The module will focus on horizontal articulation wherein contents and vertical articulation amongst different studying year levels and its association with the components to be taught.

The curriculum development model Figure 1 is highly applicable to the design of this study as it shows how the components are inter-related, referring both to each other and to the curriculum development process. Step 1 began when the re-design of the 4 year professional Biokinetics programme was considered, thus the problem and the need had to be addressed. In this instance, as depicted by the model, the requirement was the re-design of the curriculum, focusing on the needs of the student (student centred), thus forming the justification for the recontextualization of the biokinetics programme curriculum at TUT. Step 2 was to form a curriculum development team which consisted of

2 qualified Biokineticists, the curriculum practitioner and myself. Step 3 involved the systematic decisions regarding learner needs and characteristics, intended outcomes (objectives), necessary content, methods, and evaluation strategies which were made by the team. With input from the curriculum development team the candidate drafted the developmental curriculum Biokinetics Practise 1 module. The module is a framework which is to be submitted on behalf of the University for Accreditation as part of the 4-year WIL module. The testing and evaluation will be undertaken later in the course of 2021. The model illustrates a circular process and once tested on the students, feedback will identify gaps in the syllabus allowing revisions to the curriculum to be made.

The scope of the implementation, regarding framework components, is unfortunately limited in so far as mandatory implementation approval by the CHE and SAQA is a lengthy process. The implementation of the module is furthermore limited by certain time-consuming phases of the Curriculum Development Model. The candidate was involved in the conceptualisation of both the design and the model framework, following which a draft of the Biokinetics Practise 1 (WIL) module was developed in consultation with three colleagues.

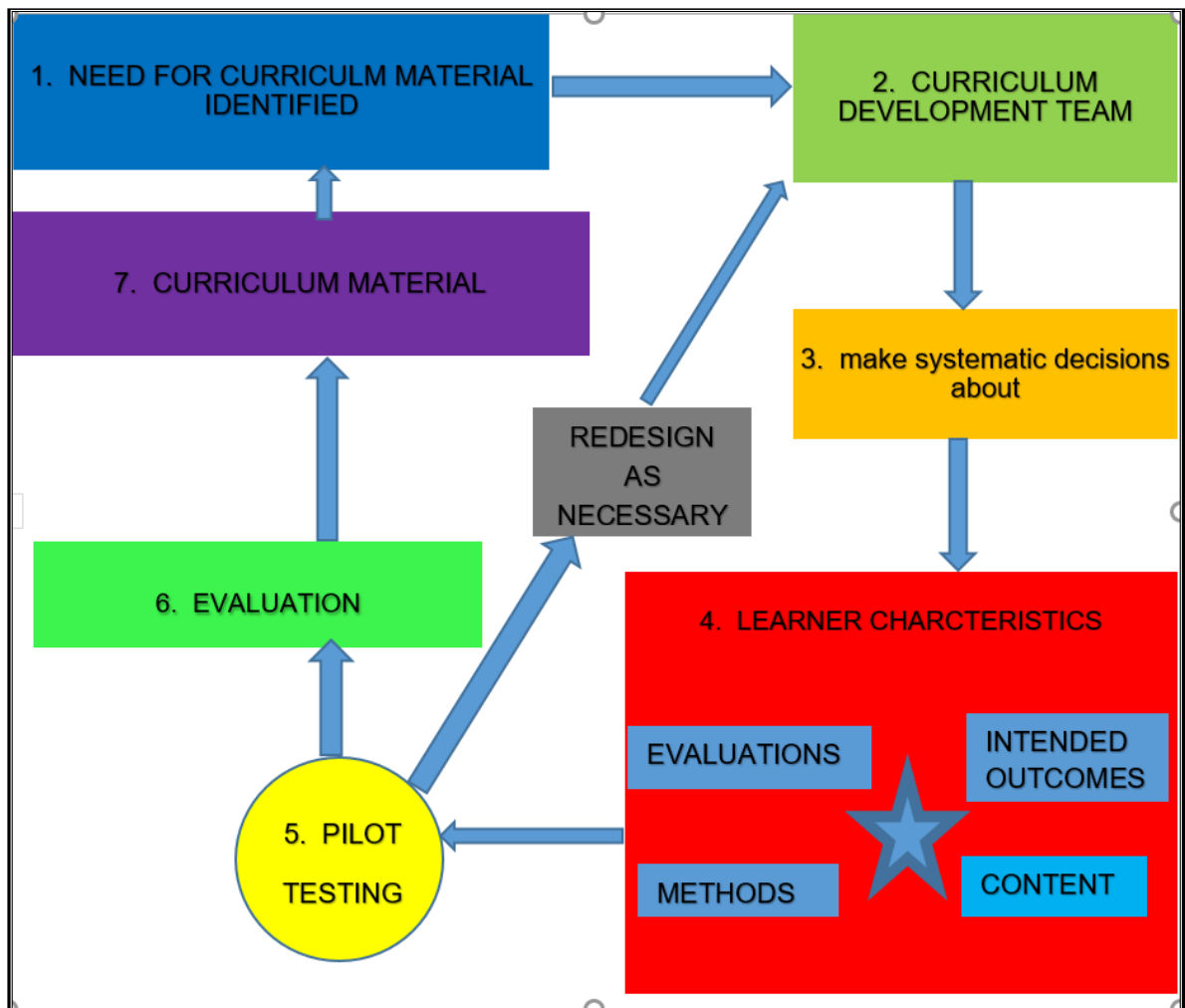


Figure 1 Biokinetics Practise Module Development based on the Curriculum Development Model by Wentling, Lai, Khor, Mohamed, Escalada, Teoh 1993)

## 2.1 Expected Outcomes

To create a spreadsheet for horizontal articulation, highlighting the seminars, demonstrations (showing quotas), and practical hours that should be spent on each of the topics in the 1<sup>st</sup> year of the Biokinetics Professional Degree.

### **3 Theoretical Perspective and Insight into the Biokinetics Profession**

This chapter provides an overview of the perspectives offered by various theorists, as well as an understanding of the nature of vocational and professional curricula, a history of the profession of Biokinetics, as well as the scope of profession, the function of a Biokineticist, and of the Biokinetics programme itself. This information is necessary in order to allow the reader to better understand the intent and the ultimate outcomes of the study.

Theories associated with the Study

#### **3.1 Bernstein's Theory of Pedagogy**

This study is hinged on the framework of Bernstein's pedagogic device which espouses the dynamic nature of a vocationally or professionally oriented curricula (Barnett, 2006).

The Bernstein Theory (Bernstein 2000), refers to horizontal knowledge which is also known as structure, and which characterises intellectual fields wherein knowledge can be considered as growing through the accumulation of new languages or through the addition of new theories. It is a principal vector for the synthesis of various domains of knowledge for example in the Biokinetics Practise 1 module Exercise Physiology, Health Promotion, and Clinical Exercise Science are all articulated towards the facilitation of selective transmission and acquisition, blending the domains into a new transdisciplinary understanding. The application of the Bernstein theory in the context of this study can be seen as the synthesis of the various theoretical modules within the 1<sup>st</sup> year Biokinetics curriculum into the transdisciplinary practical module entitled Biokinetics Practise 1 (Work Integrated Learning). This underscores the direct application of the transmission of theoretical knowledge (Exercise Physiology, among other theoretical disciplines) into practical competencies (Biokinetics Practise 1). The Bachelor of Biokinetics in health sciences is a 480 SAQA credit course at NQF (National Qualifications Framework) level 8.

This 4-year degree aligns with the Bernstein's theory in that it has different purposes and with the entry being on the level of vocational or professional preparation, while nevertheless focusing on preparing graduates by offering a more intensive, focused and applied specialisation which meets the requirements of a specific need in the industry, namely final phase rehabilitation which employs exercise as a therapeutic modality. The professional degree also aims at continuing professional development and inculcating a deep and systematic understanding of thinking, theory, and methodology in the area of specialisation. The Biokinetics degree curriculum closely aligns with Bernstein's pedagogical theory in that it allows students to develop a wide range of skills, knowledge



and attitudes that will enable them to make a meaningful and sustained contribution to their clients. Lecturers will also be able to transfer their knowledge to students who will then be able to apply a wide range of transferable skills to other professions, disciplines and in general life thereby showing the dynamic interaction of vocational and professional orientated curricula as depicted below in figure 2.

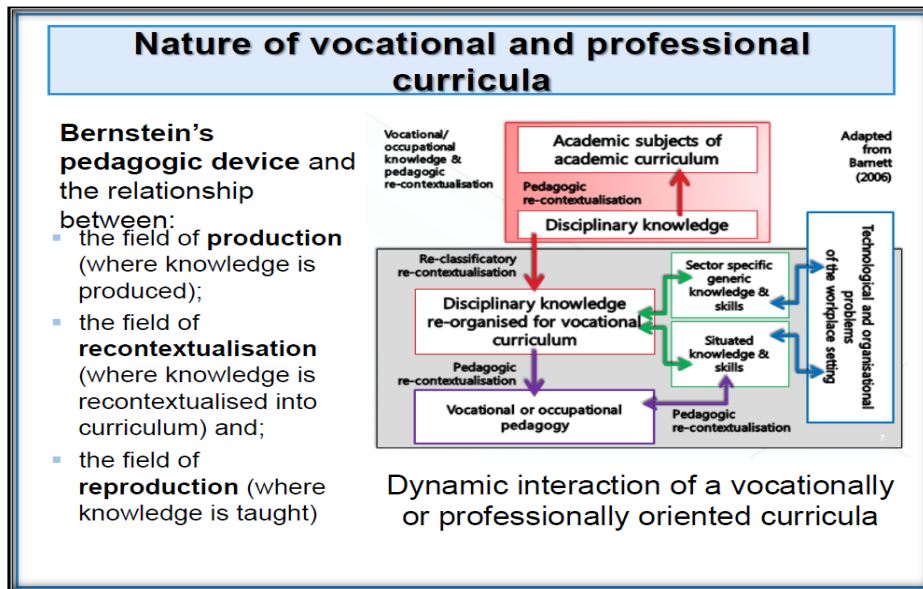


Figure 2: Vocational and Professional curricula (Adapted from Barnett, 2006)

In Figure 2, Barnett (2006) and Wheelahan (2011) explain that vocational and professional curricula must be interactive, facing both context-independent (theoretical, disciplinary, or “general”) knowledge while at the same time facing the field of practice (context dependent, situated, practical, or “particular” knowledge). Both vocational and professional curricula are required to prepare students for the rigours of the workplace and for occupational (career path) progression as well as for further academic progression towards postgraduate studies, which results in a complex relationship between theory, on the one hand, and practice, on the other. Given that a “technical model of teaching and learning promotes atomistic and mechanistic meanings of knowledge,” one can say that “technical ‘know-how’ is epitomised by the possession of ‘transferable’ skills, espoused by learning outcome objectives”. (Brancaleone & O’Brien 2011, 15.) Wheelahan (2010,137) echoed this statement when he argued that competency-based education, as offered within the vocational education and training qualifications sector of Australia and which is adopted in our Biokinetics Framework, in working through the delivery of training packages, ultimately results in knowledge that is tied to specific workplace tasks and specific roles within units of competency, thus fundamentally transforming the nature of the knowledge that is gained in so far as it is delocalised “from the vertical discourse in

which it is classified and relocate[d] into a horizontal and segmented knowledge structure.”

Basil Bernstein (1999), an educational psychologist, explored the roots of a critical account of the sociology curriculum, where the diverse approaches to sociological research were taken as the discourse's defining characteristic. In the light of the differentiation of this style of study from “*Bourdieuian*” views, this problem was further grounded in a distinction between vertical and horizontal discourses and their different modalities. The research was primarily concerned with expanding, in a more open manner, the subject matter of his earlier work. Bernstein’s proposed model created a vocabulary relating to the internal framework of specialist expertise, the positional existence of their fields or arenas of operation, the recognition and alteration of buildings, and the ways of effective performance acquisition. Bernstein furthermore sees a close connection between theoretical models and the methodology of data analysis.

### 3.2 Bernstein Theory and Association to the Curriculum Development Model

This study attempts to analyse the Bernstein Theory in association with the curriculum development process, i.e. the curriculum development model (outlined in figure 3 chapter 3). It is important to note that curriculum is the manifestation of power distribution in society meaning that social context influences curriculum development. It is critical to note that power is not a fixed entity, but a strong network formed by heterogeneous components. Society changes and the work of lectures and the introduction of new professions (being Biokinetics in this scenario) warrant lecturers to become more complicated and demanding. Therefore, developing an understanding of the nature of social changes and their effects on education is an important issue for educationalists. Therefore, the study of change in this network formation can greatly enhance the analysis of a given curriculum. Postiglione & Lee (1997, p. 2) suggest: “Schools/education systems do not exist in a vacuum. They are part of the society that surrounds them.” So, the Biokinetics curriculum that was formulated is more learner centred and incorporates the needs and demands of the current state of society.

When making an association between the Bernstein theory and the curriculum development model used in this study, it is evident that there is no line separating the two. Curriculum development is not an entity that stops before one enters a classroom and a curriculum is not a package that stops developing in the classroom. It is a continuous process of construction and modification. In the process, various people contribute, allowing the curriculum to be developed and to continue developing, which in this study

takes the form of the process of development for the Biokinetics Practise 1 (WIL) module. The South African CHE in their guideline document for Work integrated learning (WIL) states that “university teachers should think carefully about the relationship between the workplace and the university.” A university education is not about job training, and a WIL curriculum should not be dictated by economic or narrow workplace interests. Instead the university must be responsive to society and responsive to the needs of students to become productive members of society which aligns with Bernstein theory and which is learner centred. Part of the mission of higher education is to prepare students to change and improve existing practices, they need to be abstract in their thinking and challenging, not merely adapting to the world as they find it.

The Experiential model (figure 3) depicted in the methodology section of this thesis (phase II, designing experimental learning methods), aligns with the Bernstein’s theory (1971), which states that the theories informing any curriculum are analysed using the concept of “framing,” addressing the extent to which learners or teachers have control over the selection, sequencing, and pacing of content. This study demonstrates how the use of Bernstein’s concepts as an explanatory framework helps in understanding the development of the Biokinetics Practise 1 framework thereby helping to understand the characteristics of the knowledge that informs this curriculum development model.

The curriculum is learner centred and the learner has to develop a range of skills which he can articulate within the desired structure of the learning outcome. Bernstein outlines a series of steps that may be used to structure a learning experience and which can be used to inform curriculum design. Step 1 of the model refers to experiencing (activity, doing), the key concepts is to plan for discovery, to ensure the selection of developmentally adequate learning activities for learners. The outcomes of this stage will enable the individuals to learn, i.e. to explore and examining. Step 2: sharing (shared reaction and observation), the key concept is to allow time for student responses. Here, the outcome is the focus as adequate time should be allowed for learning discovery, offering learners an opportunity to respond to their experiences. The sharing of learner experience will enable growth within the group. Step 3: processing (discuss patterns and dynamics), the key concepts are to analyse patterns, and to examine shared experiences. Facilitating questions and encouraging students to think about experiences from lower to higher level of thought enables learners to better integrate the knowledge that they have acquired. Lastly, step 4: generalising (inferring principles about the real world), wherein it is necessary to guide the learner to abstract away from reality and move to the adoption or translation of what was learned, allowing them to draw conclusion from the theory and

apply them to the real world. Learners should focus on the implications of the activity to their personal life experiences.

The current study aligns with the Bernstein's theory and outlines the experiential model in that the learner will be able to apply their theoretical knowledge to the practical aspects of Biokinetics while acquiring the appropriate skills to practice in variety settings. The module will provide students with practical skills in the Biokinetics practice/Lab which will facilitate learning in the clinical field of Biokinetics through observation, participation, and workplace-based learning.

The above discussion reveals that curriculum development is closely related to social context. This characteristic serves as a basis for the debate of the development of postmodern curricula in times when the world is changing from modernity (schools with their immense scale, patterns of specialisation, bureaucratic organisation and failure to engage the emotions of many students are the prime symbols of modernity) to postmodernity (still evolving) (Lau, 2001). The curriculum developmental model is a logical and sequential approach, which shows that curriculum planning is a task of careful consideration and monitoring.

### 3.3 Bernstein Theory in Relation to other Theorists Viewpoint

Bernstein (1975) maintains that the consequences of social reproductions cannot account for the ways in which social relationships and identity are reproduced. Researchers need to understand how society transforms itself becoming the structural components of curriculum so as to facilitate social reproduction. Bernstein focuses on the concepts of classification and framing and how these concepts can serve as analytical tools for the understanding of the empirical material. The frame factor theory is then presented, leading to a model that describes the process of formulation, transformation, and realization of knowledge within educational settings (Lundgren 1972; Linde 1993). According to Lau, D. (2001, p. 127), "one implication of such an argument is that major changes in curriculum planning at the system level should not be seen merely as changes in methods of education. They are, as it were, changes in the wider society translated in changes within the educational system."

Glynnis Zena Dykes (2009) concluded that the overwhelming response of students during their Higher Education Institution (HEI) semester was of uncertainty and helplessness. The study primarily attributed this to students' opaque view of the institutional procedures and processes of the University, highlighting the potentially user un-friendly nature of the

institution. Furthermore, within separate faculties and departments, certain procedures were incoherent and lacked complementarity. The negative attitude of students regarding institutional procedures was not particular to the institution of study; it was seen as typical of student experience. Both British institutions and the Ministry of Education of New Zealand (2005), together with Smith and Curry (2005) describe sound administrative processes as key factors in contributing not only to long-term student achievement and progress, but also in fostering short-term student incorporation.

Allais, Raffe and Young (2009) studied NQFs (National Qualification Frameworks) and sought to resolve the methodological problems that could be correlated with a variety of contextual variables in the model under which they are applied. This included: a political culture and policy style that already had many normative model characteristics applied to differing degrees, political consistency and incrementalism, consensus, producer superiority and partnership, small size (populations of 4 and 5 million, respectively), as well as relatively uniform and open institutional structures that promote the process of aligning institutional arrangements. These variables led to the “success” of the Irish and Scottish systems, in part because the normative paradigm of reform was easier to implement.

Suellen Shay (2012) revealed that for more than a few years, educational sociologists rooted in social realism have argued that there are distinct awareness problems in education. Not all forms of knowledge are identical and among the various kinds of knowledge, differentiations have substantial consequences as concerns the curriculum. This claim has made a major contribution to both normative and theoretical dimensions. Economic debates, and, in particular, the consequences of education, have not been thoroughly targeted. In other words, a differentiated information theory would not have translated into an appropriate theory of curriculum distinction. Drawing on the work of Basil Bernstein regarding the distinction between information and knowledge, this study includes an analytical theory of Maton's Legitimation Code Theory, an emerging paradigm for the conceptualization of discrete higher derivatives emphasising curricula for education, stressing the importance of curricula that are occupationally and technically focused. The structure illuminates the principles, differentiating the underlying programme, thereby permitting a richer dialogue regarding the entry to and the development of an epistemology which aligns with this development module and that focuses on articulation.

A study undertaken by Jeanne Gamble (2013) attempted to suggest that a deeper understanding of knowledge differentiation in curricula involves a reconsideration of the capability base of Technical Vocational Education and Training (TVET) colleges, teaching and, by extension, of its potential to bring about good learning and the further

advancement of learning. TVET educators need to have knowledge of the subject, and they need to know how to teach the subject as well as how to develop a programme. This must be the 'heart' and not the 'periphery' of TVET. But we need to step away from the wide-brush contexts in which we often use the words “information” and “experience” in order to substitute educational knowledge as “normative” with a better understanding of the relationship between a specific type of knowledge and its pedagogy, so that we understand the constitutive impact that various types of knowledge have on what counts as instruction. Only then will education, in general, and TVET, in particular, be conceptualized in ways that prevent a “low-quality education - poverty trap” (Van der Berg et al, 2011) from being the endpoint destination of many young people in various countries. Only then can we satisfy the awareness demanded by higher-order performance and creativity.

Jenifer M Case (2015) studied contemporary criticisms of the call for new theoretical and analytical methods from student learning studies. Using the morphogenetic hypothesis of the sociologist Margaret Archer, Case proposed a social realist approach. By comparing an observational sample of engineering students at a South African university, using narrative analysis, the applicability of this method was shown. Two narratives were given in some detail in the essay itself, outlining the main contours of the research. The evolving personal identities of students were seen to be strongly reliant on their social experiences, but the possibilities for student agency morphogenesis were very small while they were at university. A careful review of these results indicated that the creation of an expanded sense of agency for students should be encouraged by true higher education.

The relation between education and didactics was further explored by Jonathan Lilliedahl (2015) through a social realist lens. The curriculum and didactics were considered to be connected and incorporated into the popular educational content problem. The author suggests that picking instructional material and fine-tuning its organization is a matter of re-designing the concepts that are to be taught and as such curricula and didactics can be interpreted as interrelated processes of such reconceptualization. Educational strategy and the organization of pedagogical activity have been viewed as independent but closely linked “circularization” and “pedagogization” activities. A sociological approach under which educational awareness is understood as something collectively created yet irreducible to power conflicts in political arenas was suggested by neo-Bernsteinian social realism. More importantly, education and instruction are not merely extrinsic problems. Intrinsic characteristics, a kind of comparatively generative logic that governs programme design as well as pedagogical practice, can also be included in recontextualization activities. The author created a typology that is analytically framed by concepts of extrinsic

relationships to and intrinsic relationships within curriculum or didactics in order to demonstrate the consequences for both curriculum and didactic theory.

Marianne Bester (2015) sought to use the semantic codes of Maton's Legitimation Code Theory (2011) in order to assess the various types of information predominant in three undergraduate nursing curricula at a University of Technology. So as to obtain a deeper understanding of the curriculum logic of each programme in relation to the type, purpose, existence, and characteristics of the certification categories, as described in the Higher Education Qualifications Sub-framework (2013), the analysis also attempted to map these forms of knowledge to Shay's curriculum distinction framework (2012). In the field of nursing, the research examined semantic areas of information creation with semantic gravity.

Having researched the above theories, the best suited theory of instruction informing the curriculum was analysed using the concept of framing or mapping whereby the learner or the teacher has control of the selection, sequencing and pacing of the study content as outlined by Bernstein (1971). The curriculum illustrates that the envisaged theory of instruction is centred on the learner, who is described as developing a range of skills which are articulated by the learning outcomes. While there is some degree of alignment between the three models, each of the models has a different focus.

#### 3.4 Biokinetics Programme at TUT

The Bachelor of Health Sciences in Biokinetics is a professional programme relevant to the current needs and skills of the country and is appropriate to the needs and aspirations of the South African people. The main purpose of this programme is to promote wellness and play a vital role in disease / injury prevention and in health promotion. Social enterprise is promoted by performing assessments of health risk factors, and by the implementation of intervention strategies to support the individual and his journey toward total wellness. Health care systems in both the public and private sector in South Africa have been struggling to keep pace with the ever-rising cost of care. In point of fact, South African public health services are now facing serious challenges in providing adequate services on many levels, a situation that has been further exacerbated given the current COVID-19 pandemic.

In the South African context, exercise is viewed as one of the cornerstones in the modification of disease patterns and is consequently seen as important in increasing longevity and decreasing mortality, as well as in improving the overall quality of life of the population. South Africa has the largest percentage of overweight and obesity in the

female population globally, and one of the fastest rates of increase in Type 2 diabetes mellitus. The 2007 South African Medical Research Council (MRC) disease report neatly stated that risk factors for both death and disease in South Africa are increasing; of the ten most prominent risk factors for death in South Africa, 28,2% are modifiable (that is to say that the risk factors may be reduced) through regular exercise. This professional qualification in Biokinetics provides learners with a sound scientific knowledge base in the field of human physiology, anatomy, kinesiology, and human movement sciences, as well as practical skills and appropriate attitudes and values to enhance health, optimize wellbeing and performance, prevent the progression of certain ailments both in individuals and in communities, as well as within the South African work environment.

Undoubtedly the training for the four-year Biokinetics professional curricula should not be regarded as “training [for] workplace tasks and roles within units of competency” (Wheelahan, 2010). The importance of disciplinary knowledge should be recognised, and prominence should be given to core disciplinary knowledge elements in each programme, yet this should not come at the expense of the development of practical expertise.



## **4 Methodology: Development of the First Year Biokinetics Practical Module (Biokinetics Practice 1) Using the Four Essential Phases of the Curriculum Development Process**

This chapter provides a step-by-step account of how the developmental approach of the framework.

### **4.1 Aim**

The aim of this study is to develop a conceptual developmental framework for Biokinetics Practise 1 (WIL) in the Biokinetics programme with a spreadsheet quota, elaborating the apportionment and the hours to be spent on each subject in year 1 of the degree, and to create an implementation plan for work integrated learning which will be referred to as Biokinetics Practise 1 as part of the 4-year professional degree in Biokinetics for 1<sup>st</sup> year students at the Tshwane University of Technology (TUT). The scope of the implementation of the curriculum developmental model is limited, as there are phases that will require the latter part of 2021 to be implemented.

### **4.2 The Research Design**

#### **4.2.1 Research Methodology**

This study utilised and incorporated a developmental framework design for the Biokinetics Practice 1 (WIL) module which will be explained as a research and development design. A draft module descriptor will eventually be developed and adopted as a first-year practical module.

Phases and steps in curriculum development (see figure 3 below) further illustrates how the 12 essential steps progress from one to the next. It also shows the interaction and relationships of the four essential phases of the curriculum development process: ( I) Planning, (II) Content and Methods, (III) Implementation, and (IV) Evaluation and Reporting. Each phase has several steps or tasks to complete in logical sequence. Figure 1 in chapter 2 exemplifies is connected to figure 3 below in that the components of figure 1 shows how they are inter-related, referring both to each other and to the curriculum development process. These steps are not always separate and distinct, but may overlap and occur concurrently. For example, the curriculum development team is involved in all of the steps. Evaluations should occur in most of the steps in order to assess progress. The team learns what works and what does not and determines the impact of the curriculum on learners after it is implemented. Each step logically follows the previous

one. It would make no sense to design learning activities before learner outcomes (learner centred) and content are described and identified. Similarly, content cannot be determined before learner outcomes are described. The curriculum development process can be seen to systematically organize what will be taught, together with who will be taught, and the manner in which the contents will be taught. In order to achieve this, the researcher made use of the interaction and relationships between the four essential phases of the curriculum development process: as per Wentling's guide to curriculum development (Wentling et al. 1993). Chapter 5 details the process undertaken in each step and the manner in which the creation of the Biokinetics Practise 1 (WIL) module was guided by the curriculum development guide featured in figure 3.

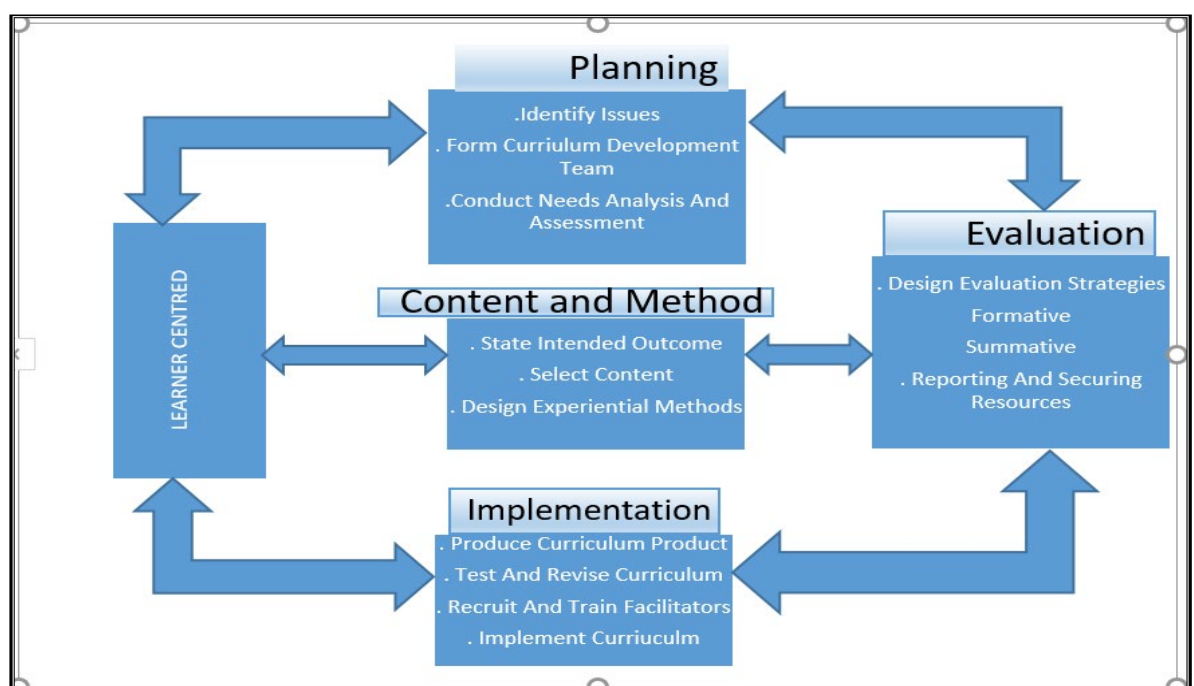


Figure 3: Wentling's guide to curriculum development (Wentling et al 1993)

In the steps of the curriculum development process, the most important task is to maintain focus on the learners (learner centred) and involve them in process. A needs analysis was done by all universities and this was the foundation of the development of the Biokinetics minimum standards which were subsequently promulgated by the HPCSA. Working from the needs analysis, the department and the researcher engaged with staff to look at the needs assessment process. Problem areas were identified, gaps between what learners know and what they need to know were identified, and the scope of the problem was clarified and defined. The gap in practical exposure prompted the decision to develop a module for Biokinetics 1 practical.

## 5 Development of the First Year Biokinetics Practical Module (Biokinetics Practice 1) Using the Four Essential Phases of the Curriculum Development Process

This chapter provide a step-by-step account of the curriculum development model. Each phase has several steps or tasks that are required to be completed in a logical sequence. The steps are however not separate and may overlap or occur concurrently. Each step logically follows the previous.

### 5.1 Phase 1 (Planning)

Planning is the first step which is further broken down into 3 sub-steps in the development phases: identification of the issue, formation of the curriculum development team, and needs assessment and analysis.

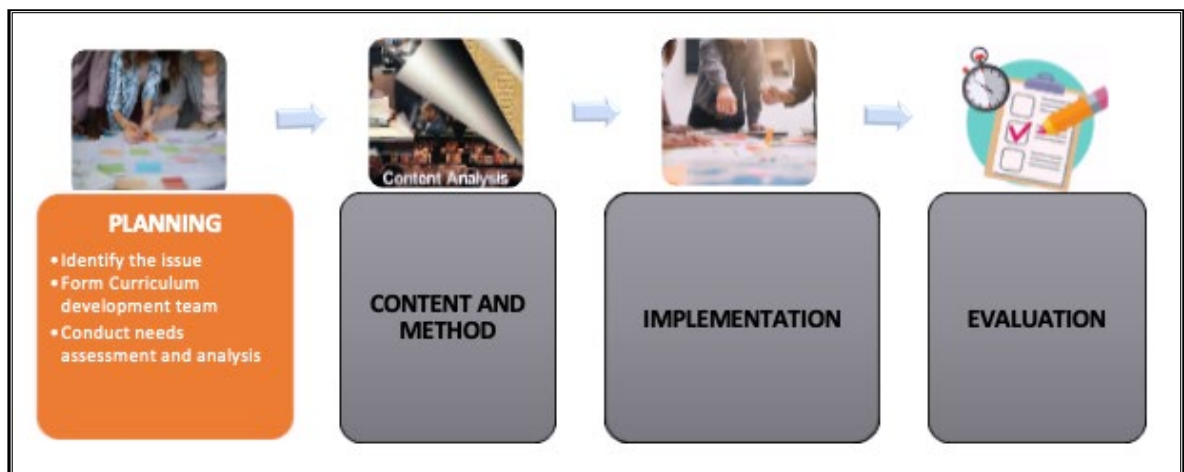


Figure 4. Planning: First Phase of the Curriculum development Plan

#### 5.1.1 Identify the issue

Following the restructuring of the Biokinetics curriculum at TUT, The Health Professions Council of South Africa (HSPCA) gazetted an updated Biokinetics higher education minimum standard guide in 2020. As a result, TUT is no longer not fully compliant with the most recent guidelines. In so far as the HPCSA minimum standard guide has been finalized, TUT is now required to comply with the published guide and thus alter its approved Biokinetics curriculum. There is a lack of consistency in the implementation phase (work integrated learning). The need for the Biokinetics Practical 1 module (WIL) was a gap that was identified when TUT restructured the pre-existing 3+1 degree in Biokinetics to the new 4-year professional degree.

### 5.1.2 Formation of curriculum development team

The scope of the Biokinetics Practise 1 module is guided by the minimum standards developed by the HPCSA which required that 1<sup>st</sup> year students be taught basic laboratory practicals so as to grasp basic skills and master the required competencies. The curriculum development team consisted of myself (being the head of department and a qualified practising Biokineticist), as well 2 other qualified Biokinetics lecturers, and a curriculum practitioner. The development of the module was conceptualised by myself as it forms part of my mini-thesis for this study. My colleagues and I have the requisite expertise and knowledge concerning the subject matter as related to Biokinetics practicals and could thus offer valuable information in order to strengthen the module. The candidate mapped the practical components, quotas and hours of the practical component. The other 2 expert Biokineticists were involved in determining the basic practicals that should be undertaken in the course of the first year and assisted in plotting the horizontal and vertical articulation of the practical components.

The curriculum practitioner was appointed by the faculty based on her experience with the logistics and with the curriculum administration form that will be submitted to the Higher education institutions (SAQA, CHE). The Biokinetics team showed good collaborative efforts and good team cohesion. The teams worked timeously and effectively with diligence when drafting the working document which will form the basis for submission for validation of the first year Biokinetics practical module.

### 5.1.3 Conduct Needs Assessment and Analysis

The curriculum team members were directly involved in identifying the needs analysis of the students based on prior lecturing experience. Further to this, when the formulation of the minimum standards and scope of practise was developed by the HPCSA, the content to be taught on a first-year level was regulated. Curriculum information was obtained through curriculum development workshops with academic staff members and a curriculum practitioner over a period of 5 years and included the following sources: HEQSF (2013) and SAQA level descriptors Document (2012) (Appendix 5), HPCSA programme accreditation criteria, unstructured interviews with staff during workshops, stakeholder (programme advisory committee) engagement, the programme and subject guides of the 4-year professional programme, and the minimum standards of training for Biokineticists.

The second developmental action was the horizontal articulation with contents associated to the components to be taught in the first year, thereby evaluating the functionality of the Way of Working model. The information gathered is illustrated in the following table.

Table 2: Mapping of the Practical Undertaken in Year 1 of Biokinetics

	First Practicals	Cases/Quota	Practical test
1st Year	Blood Pressure Sitting	30	
	Blood Pressure Standing	30	1. Explain the concept (What is blood pressure)
	Blood Pressure Cycling @ 60 RPM	30	2. Conduct a test (measure blood pressure)
	Blood Pressure Walking @ 8 Km/h	30	3. Interpret the measurement
	Heart Rate Seated	30	4. Classify the measurement (normal or at risk)
	Heart Rate Standing	30	5. Provide patient education
	Heart Rate Supine	30	
	Heart Rate Cycling @ 60rpm	30	
	Heart Rate Walking @ 6kmp	30	
	Administration of a PAR-Q	30	
	Body mass		
	Waist circumference		
	Hip circumference		
	Body Mass Index		

Table 2 illustrates the practicals to be undertaken by first-year students. Blood pressure measurements must be recorded in different positions to ensure that the biokineticist-in-training are well-aware of the influence of gravity on venous return when the patient is standing, seating, cycling, and walking. Furthermore, cycling and walking are dynamic in nature, in contrast to sitting and standing, the patient will therefore exhibit increased blood pressure. Cycling revolutions per minute (rpm) should be slow in order to elicit a moderate difference in blood pressure, and similar precautions should be taken when measuring blood pressure while treadmill walking. The variations in treadmill walking blood pressure will however be greater than during cycling because of the greater energy expenditure required for walking than for cycling. Furthermore, exercise is necessary to allow the biokineticist-in-training to distinguish between the difference in blood pressure taken while sedentary and that taken during physical activity (further distinguishing between blood pressure variations due to different types of physical activity). The biokineticist-in-training must be able to identify hypotension and hypertension when the patient is at rest, and also be able to identify sub-classifications of systolic hypertension or hypotension and diastolic hypertension and hypotension. During the exercise component (walking and cycling) the biokineticist must be able to identify systolic hypertension/hypotension and diastolic hypertension/hypotension.

The aforementioned objectives are necessary for the identification of fluctuations in resting heart rate and exercise heart rate. In addition, the Biokineticists-in-training need to

clinically identify associated fluctuations in blood pressure with heart rate response. The Biokinetics Practical module for year 1 will give students practical exposure and experience in the clinic laboratory and in the workplace (Biokinetics practices), thereby enhancing their employability upon graduation. Worked integrated learning involves the practical application of theoretical modules such as Clinical Exercise Physiology and Neuro-musculoskeletal Rehabilitation.

## 5.2 Phase II (Content and Methods)

Phase II is where the intended outcomes (what learners will be able to do after participation in curriculum activities), the content (what will be taught), and the methods (how it will be taught) are determined. Steps include: definition of the intended outcome, selection of the content, and the design of experiential methods.



Figure 5. Contents and Methods: Second phase of the Curriculum Development Plan

### 5.2.1 Intended Outcome

The educational objectives have been identified for the Biokinetics practise 1 Module and are outlined in the table below. The needs assessment processes are converted into measurable outcomes for the learners. The intended outcomes (educational objectives), as identified by the needs assessment and analysis, are developed to match learner needs which are detailed in Table 3 below as guided by (Wentling 1993, p.68).

Intended outcomes (IO) are measurable outcomes for the learners. Instructional or educational objectives are called intended outcomes, intended outcomes are the preferred term as it implies that learning is planned, intentional, and a measurable outcome is

expected. The four intended outcomes which are listed in the table below and were outlined in chapter 2. Coupled with each intended outcome are the specified objectives, the educational objectives should be what the learner will obtain during the learning process in the first year practical curriculum.

Table 3: Conceptual Developmental Framework used to obtain the Intended Outcomes

OBJECTIVES		Intended Outcomes																																																												
1	Designing the curriculum development model based on the acquisition of specific competencies	<p><b>Specific Competencies: Knowledge, Skills and Applied Competency (KSAC)</b></p> <ul style="list-style-type: none"> <li>• Communication Skills (written; verbal and interpersonal)</li> <li>• Listening skills</li> <li>• Analytical skills</li> <li>• Evaluating skills</li> <li>• Data analysis skills</li> <li>• Problem solving skills</li> <li>• Time management</li> <li>• Reading skills</li> <li>• Reasoning skills</li> <li>• Critical and creative thinking skills</li> <li>• Team-working skills</li> <li>• Entrepreneurial skills</li> </ul>																																																												
2	Horizontal articulation with contents associated with the components to be taught in the first year, thereby evaluating the functionality of the curriculum development model,	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">First Practicals</th> <th>Cases/Quota</th> <th>Practical test</th> </tr> </thead> <tbody> <tr> <td>1st Year</td> <td>Blood Pressure Sitting</td> <td>30</td> <td>1. Explain the concept (What is blood pressure)</td> </tr> <tr> <td></td> <td>Blood Pressure Standing</td> <td>30</td> <td>2. Conduct a test (measure blood pressure)</td> </tr> <tr> <td></td> <td>Blood Pressure Cycling @ 60 RPM</td> <td>30</td> <td>3. Interpret the measurement</td> </tr> <tr> <td></td> <td>Blood Pressure Walking @ 8 Km/h</td> <td>30</td> <td>4. Classify the measurement (normal or at risk)</td> </tr> <tr> <td></td> <td>Heart Rate Seated</td> <td>30</td> <td>5. Provide patient education</td> </tr> <tr> <td></td> <td>Heart Rate Standing</td> <td>30</td> <td></td> </tr> <tr> <td></td> <td>Heart Rate Supine</td> <td>30</td> <td></td> </tr> <tr> <td></td> <td>Heart Rate Cycling @ 60rpm</td> <td>30</td> <td></td> </tr> <tr> <td></td> <td>Heart Rate Walking @ 6kmp</td> <td>30</td> <td></td> </tr> <tr> <td></td> <td>Administration of a PAR-Q</td> <td>30</td> <td></td> </tr> <tr> <td></td> <td>Body mass</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Waist circumference</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Hip circumference</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Body Mass Index</td> <td></td> <td></td> </tr> </tbody> </table>	First Practicals		Cases/Quota	Practical test	1st Year	Blood Pressure Sitting	30	1. Explain the concept (What is blood pressure)		Blood Pressure Standing	30	2. Conduct a test (measure blood pressure)		Blood Pressure Cycling @ 60 RPM	30	3. Interpret the measurement		Blood Pressure Walking @ 8 Km/h	30	4. Classify the measurement (normal or at risk)		Heart Rate Seated	30	5. Provide patient education		Heart Rate Standing	30			Heart Rate Supine	30			Heart Rate Cycling @ 60rpm	30			Heart Rate Walking @ 6kmp	30			Administration of a PAR-Q	30			Body mass				Waist circumference				Hip circumference				Body Mass Index		
First Practicals		Cases/Quota	Practical test																																																											
1st Year	Blood Pressure Sitting	30	1. Explain the concept (What is blood pressure)																																																											
	Blood Pressure Standing	30	2. Conduct a test (measure blood pressure)																																																											
	Blood Pressure Cycling @ 60 RPM	30	3. Interpret the measurement																																																											
	Blood Pressure Walking @ 8 Km/h	30	4. Classify the measurement (normal or at risk)																																																											
	Heart Rate Seated	30	5. Provide patient education																																																											
	Heart Rate Standing	30																																																												
	Heart Rate Supine	30																																																												
	Heart Rate Cycling @ 60rpm	30																																																												
	Heart Rate Walking @ 6kmp	30																																																												
	Administration of a PAR-Q	30																																																												
	Body mass																																																													
	Waist circumference																																																													
	Hip circumference																																																													
	Body Mass Index																																																													
3	Serving as a foundation for future WIL modules and vertical articulation with second year theoretical modules.	<p>Apply foundational knowledge, evaluate information, interpret and integrate information with the purpose to prescribe exercise modalities as a prevention and treatment strategy.</p> <p>Perform and interpret appropriate calculations from sub-maximal exercise testing (indirect VO<sub>2</sub>, HRmax, HRR functional capacity), and use these for exercise prescription purposes</p>																																																												

		<table border="1"> <tr><td>2nd Year</td><td>Astrand Rhyming Cycle Test</td><td>15</td></tr> <tr><td></td><td>PWC170 Cycle Test</td><td>15</td></tr> <tr><td></td><td>Harvard Step</td><td>15</td></tr> <tr><td></td><td>Sit-ups (60 seconds)</td><td>15</td></tr> <tr><td></td><td>Press-ups (60 seconds males)</td><td>15</td></tr> <tr><td></td><td>Press-ups (60 seconds: females)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Hamstrings)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Quadriceps)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulders: Flexion)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulder Extension)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulder Adduction)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulder Abduction)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulder Internal Rotation)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Shoulder External Rotation)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Hip flexion)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Hip extension)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Hip Adduction)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Hip Abduction)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Calf plantarflexion)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Calf dorsiflexion)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Ankle inversion)</td><td>15</td></tr> <tr><td></td><td>Flexibility (Ankle everion)</td><td>15</td></tr> </table>	2nd Year	Astrand Rhyming Cycle Test	15		PWC170 Cycle Test	15		Harvard Step	15		Sit-ups (60 seconds)	15		Press-ups (60 seconds males)	15		Press-ups (60 seconds: females)	15		Flexibility (Hamstrings)	15		Flexibility (Quadriceps)	15		Flexibility (Shoulders: Flexion)	15		Flexibility (Shoulder Extension)	15		Flexibility (Shoulder Adduction)	15		Flexibility (Shoulder Abduction)	15		Flexibility (Shoulder Internal Rotation)	15		Flexibility (Shoulder External Rotation)	15		Flexibility (Hip flexion)	15		Flexibility (Hip extension)	15		Flexibility (Hip Adduction)	15		Flexibility (Hip Abduction)	15		Flexibility (Calf plantarflexion)	15		Flexibility (Calf dorsiflexion)	15		Flexibility (Ankle inversion)	15		Flexibility (Ankle everion)	15
2nd Year	Astrand Rhyming Cycle Test	15																																																																		
	PWC170 Cycle Test	15																																																																		
	Harvard Step	15																																																																		
	Sit-ups (60 seconds)	15																																																																		
	Press-ups (60 seconds males)	15																																																																		
	Press-ups (60 seconds: females)	15																																																																		
	Flexibility (Hamstrings)	15																																																																		
	Flexibility (Quadriceps)	15																																																																		
	Flexibility (Shoulders: Flexion)	15																																																																		
	Flexibility (Shoulder Extension)	15																																																																		
	Flexibility (Shoulder Adduction)	15																																																																		
	Flexibility (Shoulder Abduction)	15																																																																		
	Flexibility (Shoulder Internal Rotation)	15																																																																		
	Flexibility (Shoulder External Rotation)	15																																																																		
	Flexibility (Hip flexion)	15																																																																		
	Flexibility (Hip extension)	15																																																																		
	Flexibility (Hip Adduction)	15																																																																		
	Flexibility (Hip Abduction)	15																																																																		
	Flexibility (Calf plantarflexion)	15																																																																		
	Flexibility (Calf dorsiflexion)	15																																																																		
	Flexibility (Ankle inversion)	15																																																																		
	Flexibility (Ankle everion)	15																																																																		
4	Creating an implementation plan for the future (this will be discussed in phase 3 of the development plan).	As this is an iterative process, the implementation of the WIL module programme is important in order to determine areas for further enhancements (Mayfield 2011, 20). During the implementation phase, the participants' reaction, learning, and continuous evaluation scores are monitored. Demonstrations by the supervising Biokineticist, oral presentations at the clinical practice sites, practical use of equipment under supervision, a case study, and journal article discussions with the supervising Biokineticist and the clinical practice sites, as well as observation of practice and administrative management at the clinical sites are all taken into account.																																																																		



### 5.2.2 Select Content

The first step in the process was to determine the scope of the first-year Biokinetics practise 1 module. Considering the 2 staff members and I were Biokineticists and experts in our field, we understood the content of the subject matter. In order to better determine the selection of the content the following questions were addressed:

- What content should these specific learners know in order to achieve the intended outcomes and have an effect on the issue?
- What knowledge, attitudes, beliefs, and behaviours will we assume learners already know or can be considered to have before participating in the program?
- Which topics of interrelated disciplines are required in order to help learners use practices, acquire knowledge, and develop skills?
- What will learners be able to do if they master this content?

For the Biokinetics practise module we developed 2 learning units. The Biokinetics team consisting of myself (as the leader) identified the necessary knowledge required so as to accomplish the learning outcome (LO). Two LOs were developed and analysed: 1) Pre-participation health screening, physical readiness, and testing readiness among apparently healthy individuals; 2) Interpretation, prescription, and monitoring of an individualized exercise program among apparently healthy individuals. Each LO had to exemplify horizontal and vertical articulation as well as the time (hours) that will be attributed to each Learning Unit. The team was closely guided by myself due to my experience and leadership in the department. The Team and I had the task of brainstorming and we had to carefully identify the knowledge needed in order to attain the desired learning outcomes. We had to then break each LO knowledge “unit” down into facts, concepts, and principles to be remembered or understood in order to accomplish the intended learning outcome (ILO). Table 4 and 5 below summarise ILO, assessment criteria, instruction, and methods that will be used to teach the subject together with learner activities.

Table 4 Learning Outcome 1

LU:	Pre-participation Health Screening, physical readiness and testing readiness among apparently healthy individuals.			Hours	40
INTENDED LEARNING OUTCOME (ILO)	ASSESSMENT CRITERIA This will be evident when/if...	INSTRUCTION AND METHODOLOGY	LEARNER ACTIVITY AND/OR INDEPENDENT STUDY		
<p>Conducting exercise pre-participation health screening and physical activity readiness, test readiness among apparently healthy individuals.</p> <p>Select, design and implement an appropriate individualised testing protocol for apparently healthy individuals.</p> <p>Conducting physical fitness and health assessment.</p>	<p>Medical history, physical examination, and laboratory tests, evaluation of apparently healthy individuals.</p> <p>Absolute and relative contraindications to exercise testing will be identified for apparently healthy individuals.</p> <p>Informed consent prior exercise testing will be explained for apparently healthy individuals.</p> <p>Blood pressure, blood glucose and lipid profile will be analysed for apparently healthy individuals.</p> <p>Pretest instruction, test order and test environment are explained for apparently healthy individuals.</p> <p>Anthropometric measurements are evaluated for apparently healthy individuals.</p> <p>Field and submaximal graded cardiorespiratory exercise tests are evaluated for apparently healthy individuals.</p> <p>Muscular strength and endurance are evaluated for apparently healthy individuals.</p> <p>Range of motion evaluation of</p>	<p>Demonstrations by the supervising Biokineticist.</p> <p>Oral presentations at the clinical practice sites.</p> <p>Practical use of equipment under supervision.</p> <p>Case study and journal article discussions with the supervising Biokineticist and the clinical practice sites.</p> <p>Observation of practice and administrative management at the clinical sites.</p>	<p>Biokinetics practice rotations.</p> <p>Portfolio of case reports.</p> <p>Oral presentation of cases observed and evaluated at Biokinetics practices.</p> <p>Reports.</p> <p>Independent reading of evidence-based literature (journal articles).</p> <p>Case study interpretation.</p> <p>Observation and practical tasks, which include the following:</p> <ul style="list-style-type: none"> <li>• Practically administering a medical history questionnaire</li> <li>• Risk stratification of patients</li> <li>• Measure blood pressure</li> <li>• Measure lipid profile</li> <li>• Measure pulmonary function</li> <li>• Administering an informed consent document</li> </ul>		

<b>LU:</b>		<b>Pre-participation Health Screening, physical readiness and testing readiness among apparently healthy individuals.</b>	<b>Hours</b>	<b>40</b>
<b>INTENDED LEARNING OUTCOME (ILO)</b>	<b>ASSESSMENT CRITERIA</b> This will be evident when/if...	<b>INSTRUCTION AND METHODOLOGY</b>	<b>LEARNER ACTIVITY AND/OR INDEPENDENT STUDY</b>	
	<p>apparently healthy individuals.</p> <p>Power evaluation and interpretation for apparently healthy individuals.</p> <p>Speed and agility evaluation and interpretation for apparently healthy individuals.</p> <p>Balance and coordination evaluation and interpretation for apparently healthy individuals.</p>			

Table 5: Learning Unit 2

<b>LU:</b>		<b>Interpretation, prescription and monitoring of individualized exercise program among apparently healthy individuals.</b>	<b>Hours</b>	<b>40</b>
<b>INTENDED LEARNING OUTCOME (ILO)</b>	<b>ASSESSMENT CRITERIA</b> This will be evident when/if...	<b>INSTRUCTION AND METHODOLOGY</b>	<b>LEARNER ACTIVITY AND/OR INDEPENDENT STUDY</b>	
<p>Apply foundational knowledge, evaluate information, interpret and integrate information with the purpose of prescribing exercise modalities as a prevention and treatment strategy.</p> <p>Perform and interpret appropriate calculations from sub-maximal exercise testing (indirect VO<sub>2</sub>, HR<sub>max</sub>, HRR functional capacity), and use these for exercise prescription purposes</p>	<p>Blood pressure, blood lipids, heart rate, RPC, pulmonary function and signs and symptoms are interpreted during, post maximal and submaximal graded exercise test for apparently healthy individuals.</p> <p>Exercise testing and programme design will be evaluated among apparently healthy individuals.</p>	<p>Demonstrations by the supervising Biokineticist.</p> <p>Oral presentations at the clinical practice sites.</p> <p>Practical use of equipment under supervision.</p> <p>Case study and Journal article discussions with the supervising Biokineticist and the clinical practice site.</p> <p>Observation of practice and administrative management at the clinical sites.</p>	<p>Biokinetics practice rotations.</p> <p>Portfolio of case reports.</p> <p>Oral presentation of cases observed and evaluated at Biokinetics practices.</p> <p>Reports.</p> <p>Independent reading of evidence-based literature (journal articles).</p> <p>Case study interpretation.</p> <p>Report writing of key findings from a graded exercise test.</p> <p>Construct individualized exercise programmes for apparently healthy persons.</p>	

After the development of the Learning unit, further thought was given to the identification of necessary knowledge required to accomplish the intended outcome, performance or skill requirements of each outcome, important attitude elements for the outcome, as well as to the organisation of the knowledge, attitude, skills, aspirations, and behaviour (KASAB) elements in a logical sequence. This process was undertaken and is depicted in the table 6 below.

Table 6: Necessary knowledge required to ensure the intended outcome

<b>Knowledge, Skills and Applied Competency (KSAC)</b>	<b>Values, Attitudes and Expected Behavior</b>	<b>Basic Competencies</b>
<ul style="list-style-type: none"> <li>• Communication Skills (written, verbal, and interpersonal)</li> <li>• Listening skills</li> <li>• Analytical skills</li> <li>• Evaluating skills</li> <li>• Data analysis skills</li> <li>• Problem solving skills</li> <li>• Time management</li> <li>• Reading skills</li> <li>• Reasoning skills</li> <li>• Critical and creative thinking skills</li> <li>• Team-working skills</li> <li>• Entrepreneurial skills</li> </ul>	<ul style="list-style-type: none"> <li>• Professionalism</li> <li>• Ethical values and behaviour</li> <li>• Self-discipline</li> <li>• Curiosity</li> <li>• Responsibility</li> <li>• Reliability</li> <li>• Empathy</li> <li>• Scientific thinking</li> <li>• Independence</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and solve problems</li> <li>• Work effectively with others</li> <li>• Organise and manage themselves</li> <li>• Collect, analyse, organise and critically evaluate information</li> <li>• Communicate effectively</li> <li>• Use science and technology effectively and critically</li> <li>• Utilise a variety of strategies to promote learning</li> <li>• Demonstrate medical ethical, -jurisdiction and sensitivity to human rights</li> <li>• Develop managerial and entrepreneurial opportunities</li> <li>• Participate as a responsible citizen</li> <li>• Demonstrate an understanding of the world as a set of related systems</li> </ul>

The analysis, design, and development of the Biokinetics practise module has taken approximately nine months. The full Implementation and evaluation of the WIL module will only be effective fully once the HEI committee approves the course module (Appendix 3: Draft module descriptor). The study has thus only been implemented up to and including

the second stage of the developmental model. Thus, implementation and evaluation will be conducted with the new 2021 cohort of students.

#### 5.2.4 Design Experiential Learning Methods

The Experiential Learning Cycle Facilitators Guide was referred to when designing the learning methods Curriculum Development for Issues Programming (USDA 1992). Below in figure 6 is the guide which aligns with the CHE WIL guidelines which is used as an umbrella term to describe curricular, pedagogic and assessment practices, across a range of academic disciplines that integrate formal learning and workplace concerns and includes classroom-based and workplace-based forms of learning that are appropriate for the professional qualification. Academic and workplace practices are aligned for the mutual benefit of students and workplaces (Council for Higher Education: Work Integrated Learning: a good practice guide 2011).

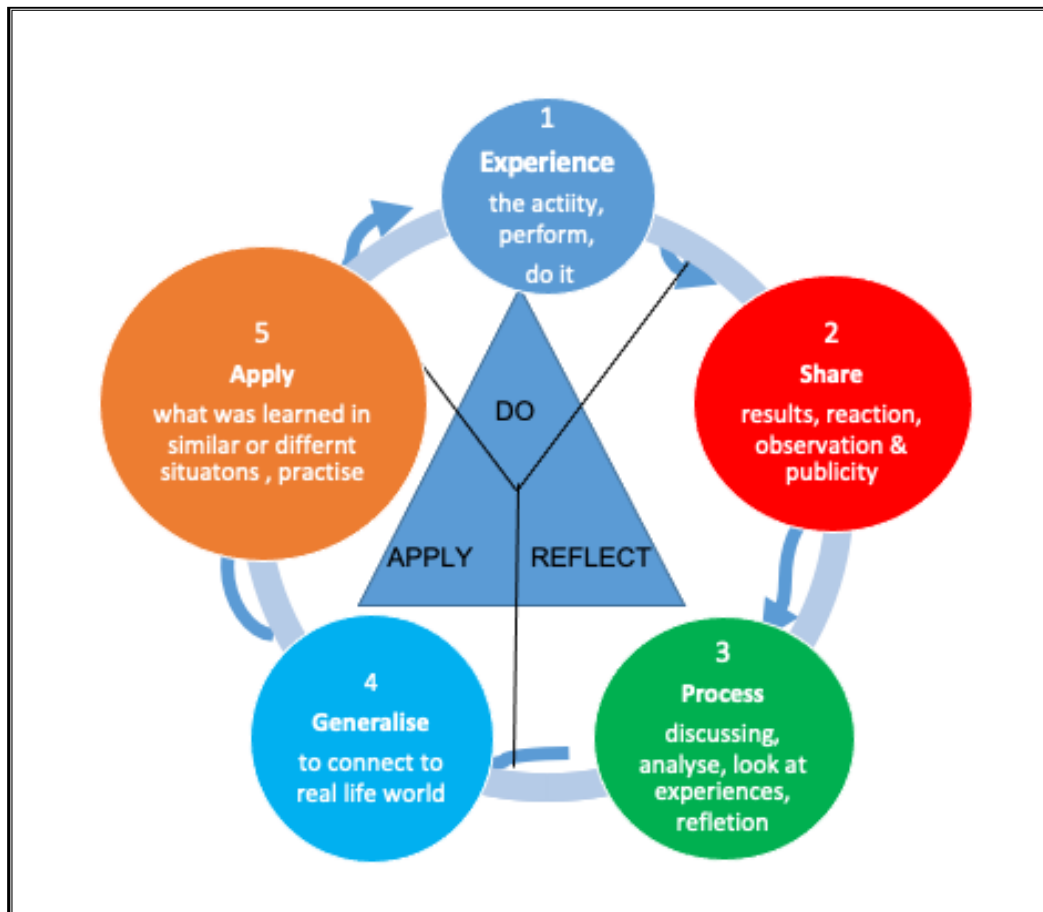


Figure 6: The Experiential Learning Cycle Facilitator Guide, Curriculum Development for Issues Programming (USDA 1992).

Learning activities were designed to adhere to the two intended outcomes above (tables 4 & 5). This section incorporates various topics, for example learning-styles as well as activities to be taught, types of activities, a sample test for the lecturer (Appendix 2), and, lastly, a description of the infrastructure where learning will take place.

Students will rotate through the TUT Biokinetics laboratory/practice for 30 weeks, 2 hours per week, where they will acquire knowledge, skills and values in conducting: 1) Exercise pre-participation health screening and physical activity readiness, test readiness among apparently healthy individuals; 2) Physical fitness and health assessments, prescription and monitoring of individual and group exercises (including therapeutic recreation) in apparently healthy individuals under supervision.

Independent learning activities, such as independent reading of journal articles and case study analysis will allow the students to identify, evaluate, analyse, and critically reflect on complex problems. An understanding that problem solving and principles in exercise testing and prescription do not exist in isolation, but are contextualised to the individual- and are system-bound will be developed. Students will apply evidence-based solutions and theory-driven arguments aimed at selecting the appropriate exercise test and constructing an individualised exercise programme for apparently healthy individuals.

Self-study and application will encourage responsibility and assist the learner in managing their time efficiently and take responsibility for their learning. This will encourage self-reflection and promote the reading of evidence based literature relevant to the field of study.

Patient interaction will facilitate appropriate decisions based on ethical conduct and professionalism. The core values that will be learnt are: punctuality, responsibility, empathy privacy, and confidentiality. This will promote effective communication skills, accountability and professionalism when testing apparently healthy individuals. Oral group and individual presentations at the externship sites will create awareness regarding health and wellness. This will foster team work and aid in the initiation of community wellness projects. Team work will encourage collaborative learning and facilitate values such as respect, responsibility, and team work. This will encourage students to take full responsibility for their own work and responsible use of resources. Conducting administrative and business tasks at the clinical practice sites, will result in students being continually aware and undertake full responsibility for their learning. This will contribute to problem-based learning, accountability, leadership qualities and entrepreneur skills.

### 5.3 Phase III (Implementation)

The third phase of the developmental Model was not executed as the development of the module ended in phase three. The Phases 3 and 4 will take place in 2021.



Figure 7: Implementation: Third phase of the Curriculum Development Plan

#### 5.3.1 Produce Curriculum Product

The 4-year professional degree in Biokinetics was an adaptation of the (3+1) degree. There was no budgetary strain on the development of the new programme and much time and thought went into the planning and mapping of the Biokinetics Practicals 1 module. This module initially was not initially developed in the 4-year professional degree, however after the approval of the HPCSA minimum standards, amendments are underway to adjust the existing approved qualification. In the process of re-designing the module we have utilised the pre-existing study material and addressed the gaps that were identified in the module. Based on the draft module descriptors a printed student's study guide will be handed out in lectures as many students may not have computers/devices and are from historically previously disadvantaged communities. The student study guide will also be made available on the learning management system (LMS). The curriculum development was guided by the programme advisory committee board, as well as by national and international stakeholders (ensuring comparability), industry partners, research articles and books, databases and the internet, and by regulatory boards (BASA and HPCSA).

### 5.3.2 Test and Revise Curriculum

The types of practical, the hours required, and the competencies aimed at were clearly set out when I developed the WIL module. A sample test was developed (Appendix 2) and will be piloted after the first term in 2021. A formative assessment will be conducted and a pilot test formulated on areas of competencies so as to gather information as to whether what was set out in the curriculum actually tests the students' competency levels, as the researcher should evaluate that the programme remains learner-centred and whether it achieves the required results. Formative information is a continuous process that will be undertaken throughout the year for the WIL module. The lecturers and preceptors will test the sample test which includes an evaluation schedule for the first-year cohort together with a feedback form that the students will return to myself and to the entire curriculum team. This step is divided into two separate phases: 1) The test for the WIL module will be conducted in the laboratories under the instruction of the lecturers attached to a specific practical; 2) The sample test (evaluation tool) will be tested for its effectiveness (reliability and validity).

### 5.3.3 Recruit and Train Facilitators

No additional lectures will be needed as the programme has 6 qualified Biokineticists who are trained and experienced in the practical areas of Biokinetics, they will thus be able to effectively implement the programme. The lecturers will, on a yearly basis, be required to attend courses, workshops, and seminars in order to continue their continuous professional development. The programme will appointment one clinical training coordinator and two clinical preceptors. The clinical training coordinator liaises with clinical facilities, oversees/manages all part-time and fixed-term clinical staff, coordinates clinical training placements and the transportation of students. The role of the coordinator is to further oversee the skill laboratory, as well as the completion and submission of clinical training records. The preceptors will be qualified experience biokineticists who have been in training for a minimum of 3 years. Clinical preceptors will be tasked with clinical accompaniment, the creation of an environment conducive to the clinical training of students, simulated clinical training, and clinical training related research and delegated tasks.



### 5.3.4 Implementation of the Curriculum

The Third Phase of the Curriculum Development Model is Implementation (Figure 7). This study has only been completed up to and including Phase 2. Phases 3 and 4 will be gradually implemented once approval has been obtained from the HEI committees (SAQA & CHE). In phase 3, the curriculum materials (the draft module descriptor document) will be finalised, highlighting the horizontal articulation, vertical articulation, mapping of the quotas and hours per practical task, acquisition of competencies, and, lastly, detailing the competencies that are taught into practises. In this stage an iterative approach will be adopted for practicals (testing and revising them). Once the developed draft module has been approved by the HEI committees (CHE and SAQA), the module will be implemented, taking effect for the first-year students of 2021.

### 5.4 Phase IV (Evaluation)

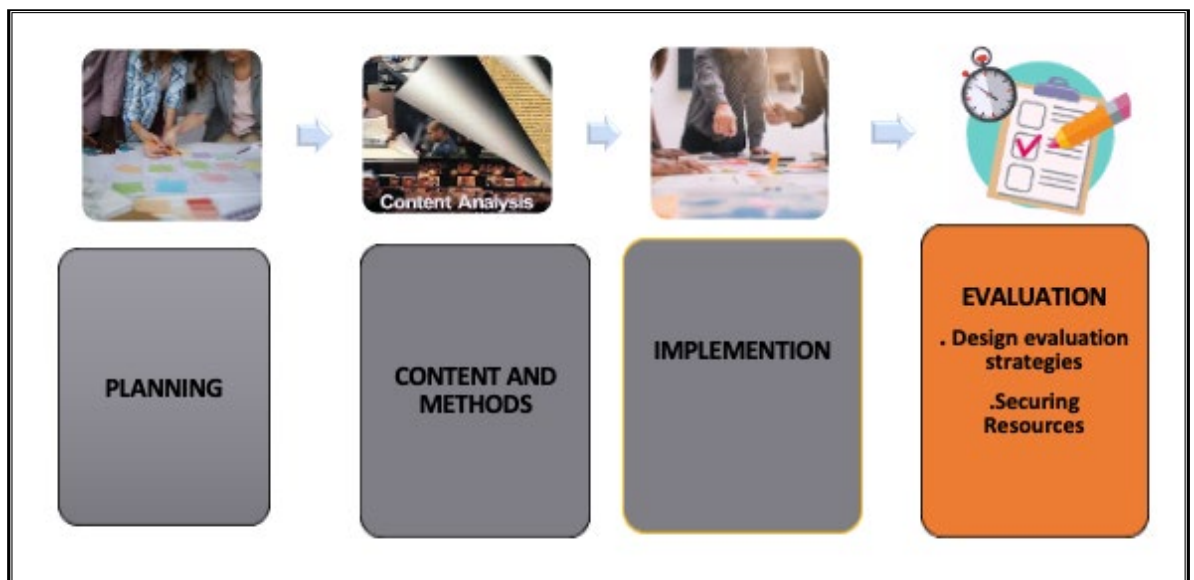


Figure 8: Evaluation: Fourth phase of the Curriculum Development Plan

The evaluation process takes the form of two types of evaluation, deploying both formative and summative types of evaluation, and was used during curriculum development. While formative evaluations are used during the needs assessment, product development, and testing steps, summative evaluations are undertaken in order to measure and report on the outcomes of the curriculum (Wentling et al. 1993). Resources for the module are available as it is part of the redevelopment of the degree course, moving from a “3+1” qualification to a 4-year professional qualification. Funding is available from our 1<sup>st</sup> stream of income which is funding received from the Department of

Higher Education in South Africa. Evaluation was built into the process at several levels. The activities in phase III and IV of the curriculum development model are focused on in phase II (content and methods). A conceptualised module was developed by myself (Appendix 4) depicting the first year WIL component that will be offered as Biokinetics Practise1 in the first year. Based on the developmental module descriptor, a study guide will be published. The evaluation criteria has already been produced and will follow the methods detailed in table 7 below. The candidate has also developed a sample evaluation form for practical evaluations which will be tested in the next few months. The implementation of the WIL (Biokinetics practise 1) module has still to be finalised.

### Evaluation Strategy

Table 7 illustrates the assessment plan, offering a clear layout of the integrated assessment plan of all the tasks students will be expected to complete. Students are required to complete one assignment as well as the portfolio, four (4) case oral presentations and practicals, and one practical examination, accounting for 41% of the notional time of 100 credits. All tasks are directly aligned with the ELO's as indicated.

### Evaluation Plan

The assessment plan, as detailed in Table 7, provides a clear layout of all integrated assessment tasks, in line with SAQA requirements. The purpose of each task is clearly indicated and is furthermore aligned with the needs of the promotion regulations of the module.

Table 7: Evaluation Plan

UNIT	ASSESSMENT METHOD/TYPE	ASSESSMENT INSTRUMENT	DESCRIPTION AND PURPOSE	SOURCE – PERSON WHO ASSESSES	TOOL FOR MEASURING ASSESSMENT	WEIGHT (%)
1	Observation	Case Presentation and practical exercises	Individual practical competencies in Pre-exercise evaluation for apparently healthy individuals	Peer review and Supervising Biokineticist	Rubric and checklist	10%
1 & 2	Observation	Case Presentation and practical exercise	Individual practical competencies in principles in exercise programme design. Rational for practically selecting relevant exercises for apparently healthy individuals.	Peer review and Supervising Biokineticist	Rubric and checklist	10%
1 & 2	Observation	Case Presentation and practical exercise	Individual oral case study presentation and practical demonstrations relevant to the case. The case observed at the Biokinetics clinical site will be	Peer review and Supervising Biokineticist	Rubric and checklist	10%

			randomly selected by the lecturer/examiner.			
<b>1 &amp; 2</b>	Observation	Case Presentation and practical exercise	Individual oral case study presentation and practical demonstrations relevant to the case. The case observed at the Biokinetics clinical site will be randomly selected by the lecturer/examiner.	Peer review and Supervising Biokineticist	Rubric and checklist	10%
<b>1 &amp; 2</b>	Product	Portfolio of evidence	Compilation of cases overserved and evaluated at Biokinetics clinical practice sites. This will be written as a case report and filed as portfolio of work done	Lecturer Peer review and Supervising Biokineticist	Rubric	20%
<b>1 &amp; 2</b>	Observation	Practical Examination	Practical board exam, which will include OSCEs and clinical competencies in exercise testing and prescription	Lecturer and supervising Biokineticist	Rubric and checklist	40 %
						<b>TOTAL: 100</b>

The majority of the assessment tasks will be evaluated by the academics whilst others will be demonstrated as presentations and assessed through observation during a panel evaluation that will include external moderators. Feedback on all assessments should be in accordance with the requirements laid out in the programme assessment policy.

This module is further designed with the purpose of directly supporting learning and of providing the students with the relevant applied competencies required to both conduct exercise testing and to prescribe exercise regimes to multiple patients. All assessment tasks are documented, and the assessment marks are submitted via the ITS system of the university. This occurs once all required moderation and peer reviewing have been finalised.

## 6 Conclusion and Recommendations

The development of the Biokinetics curricula was a successful exercise as the aims and main research question were answered through the creation of a spreadsheet for horizontal articulation, highlighting the seminars, demonstrations and practical hours that should be spent on each of the topics in 1<sup>st</sup> year Biokinetics Professional Degree.

Furthermore, a spreadsheet quota, showing the quota and the hours that should be spent on each subject in year 1 of the degree, will be created: this will detail whether horizontal or vertical articulation should be regarded as the “training of Workplace tasks and roles within units of competency” (Wheelahan 2010). The Biokinetics profession needs to recognise the importance of disciplinary knowledge and to give greater prominence to core disciplinary knowledge elements in each year of study, without hindering the development of practical expertise.

One can draw from this study is the value of incorporating relations between subjects and contexts and between transmitters and acquirers into the analysis and discussion of a subject. The use of Bernstein’s theoretical work allows for the complexities in which social relations actively form pedagogical practices, codes and modalities that constitute, limit or change the direction of a subject. The curriculum development model process builds on the steps to provide a systematic approach.

The quality of the study has maintained good standards. While the iterative and developmental approach regarding the manner in which the articulation of the practical component in each subject progresses to the next was discussed and mapped out, the candidate is of the opinion that this is sufficient for the 1<sup>st</sup> year level of study. The exercise of the Biokinetics practise practical model (WIL) is considered reliable in so far as the document is formulated to be submitted to the South African Higher education board as the template for all Biokinetics programmes. Similar mapping will be undertaken for the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> year of WIL practice.

Most importantly, the end product of this developmental study has proved to be a useful exercise for the department, the faculty and the overall organisation of Tshwane University of Technology, particularly as it occurred immediately after the approval of the minimum standards in October 2019. The development project was initiated as a mini-thesis, and it was hoped that this would evolve into a working document for the four-year professional Biokinetics programme which was already underway (based on my concept and on the mapping of the practicals for horizontal and vertical articulation in the first year together with the mapping that was done connecting the third year to the fourth year of the

professional degree programme). Following this, the process of mapping the learning units with sub sections which encompassed intended learning outcomes (ILO) was initiated, and assessment criteria, instruction, methodology, and, lastly, learner activities were detailed. Assessment encompassing both the assessment strategy and the assessment plan was clearly drafted.

The programmes task team took part in the final development of the concept mapping and the mapping of the second, third and fourth year will be undertaken in the same manner. The task team consisted of qualified registered Biokinetics lecturers with either a Master's or PhD qualification in Biokinetics as well as a curriculum practitioner with a PhD in curriculum development employed by TUT to guide the task team through the process. The curriculum practitioner furthermore gave me guidance regarding the development of the module. The plan that has been developed will, by the end of the four-year professional degree, equip students to master the skills and competencies required for the workplace. The programme lectures have also been encouraged and mandated to create professional capacity development in concert with industry so as to keep abreast with new trends and teaching in the workplace which can, in turn, aid in their teaching of the students in the classroom.

Based on the outcome of the developmental aspect of the study, the candidate believes that integration on both the horizontal and the vertical level provide the students with sound knowledge in the field of Biokinetics.

#### 6.1 Recommendation for Future Research

Based on the requirements of the regulatory board and the amendments to the minimum standard of learning for the profession, which have now been developed for the first year for the TUT Biokinetics practical, a similar exercise is underway and is nearing completion for the remaining three years of study. Additionally, the candidate believes that the newly drawn up first year sample assessment test will be piloted in order to test the validity of future assessments. As this is a 480-credit professional degree, the curriculum of this qualification equips students with sufficient research capacity in the methodology and research techniques of the field of Biokinetics. Research is an important part of the curriculum for this qualification in so far as students will be working with patients and this opportunity allows them to conceptualise projects that could be the subject of further research. Additionally, all exercises prescribed to patients should be grounded in evidence-based practices. This will sufficiently prepare students, allowing them to vertically articulate and pursue a Master's Degree in a relevant field after completing this professional degree.

## 6.2 Reflection on own Learning

The study candidate study found this thesis to be educative and challenging. The thesis was conducted on a rigorous schedule, during the treacherous and difficult times of the COVID-19 pandemic. The initial topic that was chosen could not be pursued as the ethical clearance process at TUT is lengthy, and time was of the essence as concerns the completion of the thesis. Furthermore, students were not present for face-to-face lectures, and this was a significant and ultimately insurmountable obstacle to the testing of teaching methods which formed the core of the initial proposal (virtually projecting all our practicals on VR goggles). Thus, given time constraints, the candidate changed her topic to the developmental mapping of the practicals for the first year Biokinetics Work Integrated Learning module gaining significant insight into the curriculum development of health sciences courses through reading literature regarding curriculum development. The research topic, aims, objectives, and methods all aligned with the thesis plan.

The process of curriculum developmental aided the candidate in gaining invaluable knowledge concerning the theories which underpin curriculum design and furthermore expanded her knowledge as concerns the mapping out of a curriculum. In preparing the thesis, the candidate was guided by the curriculum advisor, and this together with the practical task that is at the core of this thesis enabled her to significantly deepen her understanding, while learning valuable skills.

While writing the thesis, the candidate contacted her supervisor when guidance was needed, gave updates, and received feedback. Several TEAMS (virtual meetings) were held in order to gain clarity regarding the subject, these in-depth discussions on the progress of the thesis were invaluable. Many e-mails and WhatsApp messages were exchanged with the supervisor, who offered more detailed advice, clarification, and feedback. This created a warm environment that was conducive to success especially in so far as the candidate could approach the supervisor at any given time. This resulted in good research output, expanding the candidate's own skills and experience as a researcher. During the recent and unprecedented period of the COVID-19 pandemic, the candidate realised that timing is never within one's control and that improvisation is often required in order to achieve the desired results. There were times in which the candidate had to equip herself for unexpected changes, cancellations, or rescheduling. The candidate was able to create a developmental model clearly outlining learning output units, illustrating how to articulate the various practical components horizontally and vertically.

The challenges experienced in the study were that the topic of curriculum development and the literature concerning theories of education are novel to the candidate's primary area of expertise as the candidate is from a health science background. This has made the study all the more enriching in so far as the literature and experience has enhanced the candidate's learning and skills in the area of curriculum development.

## References

Allais, S., Raffe, D. & Young, M. 2009. Researching NQFs: some conceptual issues. International Labour Organization.

Barnett, M. 2006. Vocational knowledge and vocational pedagogy. In Young, M. & Gamble, J. (eds). Knowledge, curriculum and qualifications for South African further education, pp. 143–157. Human Resources Research Council Press. Pretoria.

Bernstein, B. 1971. *Class, Codes and Control: Theoretical Studies towards a Sociology of Language*. Routledge & Kegan Paul. London.

Bernstein, B. 1975. *Class, Codes and Control: Towards a Theory of Educational Transmission*. Routledge & Kegan Paul. London.

Bernstein, B. 1999. Vertical and horizontal discourse: an essay. *British Journal of Sociology of Education*, 20, 2, pp. 157-173.

Bernstein, B. 2000. *Pedagogy, Symbolic Control and Identity. Theory, Research, Critique*. Revised Edition. Rowman & Littlefield. Boston.

Bester, M. 2016. Mapping our way to coherence, alignment and responsiveness. *South African Journal of Higher Education*, 26, 2. <https://doi.org/10.20853/26-2-161>

Biokinetics Association of South Africa. Biokinetics. Available at: [https://www.biokineticssa.org.za/Public/Biokineticist\\_MoreInfo#:~:text=Biokinetics'%20primary%20function%20is%20to,based%20physical%20activity%20programme%20prescription](https://www.biokineticssa.org.za/Public/Biokineticist_MoreInfo#:~:text=Biokinetics'%20primary%20function%20is%20to,based%20physical%20activity%20programme%20prescription). Accessed: 20 February 2021.

Biokinetics Oudtshoorn. Available at: <https://www.bodyinnovation.co.za/the-role-of-biokinetics-in-health-fitness/> Accessed: 10 March 2021.

Brancaleone, D. & O'Brien, S. 2011. Educational commodification and the (economic) sign value of learning outcomes. *British Journal of Sociology of Education*, 32, 4, pp. 501-519.



Case, J. M. 2015. A social realist perspective on student learning in higher education: the morphogenesis of agency. *Higher Education Research & Development*, 34, 5, pp. 841-852.

Council for Higher Education: Work Integrated Learning: a good practice guide. 2011.

Available at:

[https://www.che.ac.za/sites/default/files/publications/Higher\\_Education\\_Monitor\\_12.pdf](https://www.che.ac.za/sites/default/files/publications/Higher_Education_Monitor_12.pdf)

Dykes, G.Z. 2009. Recognition of prior learning (RPL) and support: are the learning needs of RPL first-year students different? *Social Work/Maatskaplike Werk*, 45, 3, pp. 314-326.

Ellapen, T.J. & Swanepoel, M. 2017. The evolution of the profession of biokinetics. *South African Journal of Research in Sport Physical Education Recreation*, 39, 1, pp. 41-50.

Gamble, J. 2013. Why improved formal teaching and learning are important in technical and vocational education and training (TVET). *Revisiting global trends in TVET: Reflections on theory and practice*, p. 204.

Grobler, B.K., Ellapen, T.J., Paul, Y., Strydom, G.L. 2021. The strategic development and strengthening of the profession of Biokinetics, *African Journal of Health Professional Education*, 13, 1, pp. 1287.

Higher Education Qualification Sub-Framework. 2013. *South African Government Gazette No. 819 of 17 October 2014*.

Lau, D. C-M. (2001) Analysing the curriculum development process: three models, *Pedagogy, Culture and Society*, 9:1, 29-44

Lilliedahl, J. 2015. The recontextualisation of knowledge: towards a social realist approach to curriculum and didactics. *Nordic Journal of Studies in Educational Policy*, 1, 1, pp. 40-47.

Linde, C. 1993. *Life Stories: The Creation of Coherence*. Oxford University Press. Oxford.

Lundgren, U. P. 1972. *Frame factors and the teaching process: A contribution to Curriculum theory and theory of teaching*. Almqvist & Wiksell. Stockholm.

Maton, K. 2011. Knowledge-building. Analysing the cumulative development of ideas. In Ivinson, G., Davies, B. and Fitz, B. (eds.) *Knowledge and Identity: Concept and applications in Bernstein's sociology*. Routledge. London.

Mayfield, M. 2011. Creating training and development programs: Using the ADDIE method. *Development and Learning in Organizations*, 25, pp. 19-22.  
10.1108/14777281111125363.

New Zealand Ministry of Education, 2005. Supporting students in tertiary study: a summary of a synthesis of research on the impact of student support services on student outcomes in undergraduate tertiary study. Rivers, J (ed.)

Postiglione, G. A. & Lee, W. O. (1997) Schooling and the Changing Socio-Political Setting: an introduction. In G. A. Postiglione & W. O. Lee (Eds) *Schooling in Hong Kong: organisation, teaching and social context*. Hong Kong: Hong Kong University Press.

South African Qualifications Authority. 2012. Level Descriptors for the South African National Qualifications Framework. Available at:  
[https://www.saqqa.org.za/sites/default/files/2019-11/level\\_descriptors.pdf](https://www.saqqa.org.za/sites/default/files/2019-11/level_descriptors.pdf)

Shay, S. 2012. Educational development as a field: Are we there yet? *Higher Education Research & Development*, 31, 3, pp. 311-323.

Smith, L. & Curry, M. 2005. Twelve tips for supporting online distance learning on medial post-registration courses. *Teacher*, 27, 5. pp 396-400.

Strydom, G.L. 2005. Biokinetics – The development of a health profession from physical education: A historical perspective. *South African Journal for Research in Sport, Physical Education and Recreation*, 27, 2, pp. 113-128.

United States Department of Agriculture/ Extension Service (USDA). 1992. Curriculum development for issues programming: A national handbook for Extension Youth Development Professionals. U.S. Department of Agriculture: Extension Service and Land-Grant University Cooperative Extension Services. Washington, D. C.

Van der Berg, S., Burger, C., Burger, R., de Vos, M., du Rand, G., Gustafsson, M., Moses, E., Shepherd, D., Spaull, N. Taylor, S. van Broekhuizen, H., & von Fintel, D. 2011.

Low quality education as a poverty trap. Working Papers 25/2011. Stellenbosch University, Department of Economics.

Wheelahan, L. 2010. *Why knowledge matters in curriculum*. Routledge. London.

Wheelahan, L. 2011. Vocational qualifications and access to knowledge. In Ivinson, G., Davies, B. and Fitz, B. (eds.) *Knowledge and Identity: Concept and applications in Bernstein's sociology*. Routledge. London.

Wentling, T., Lai, K.K., Khor, Y-L., Mohamed,R., Escalada, M., Teoh, C-H. 1993. *Planning for effective training: A guide to curriculum development*. Rome, Italy. Food and Agriculture Organization of the United Nations (FAO).

## Appendices



## Professional Board for Physiotherapy, Podiatry and Biokinetics

### Minimum standards for the training: **BIOKINETICS**

#### **1. PREFACE**

The profession of Biokinetics was established within the South African context to fill the gap that was identified between the return of functionality and optimisation of performance and movement through the application of exercise-based interventions. Over the years, the body of evidence related to the benefits of exercise has increased. It is evident, particularly within the areas of disease and injury prevention, management and treatment of non-communicable diseases (NCDs) or chronic diseases and neuro-musculoskeletal conditions. South Africa has an increasing burden of NCDs. Therefore, the profession of Biokinetics is crucial as part of the multi-disciplinary health team to address this burden of disease within the South African context. The Biokinetics profession's scope of practice is consistent and aligned with several international professions such as exercise physiologists from Australia, certified clinical exercise physiologists from the USA and athletic trainers from the USA. The profession of Biokinetics is based on the principles recognised by several international organisations such as Exercise and Sport Science Australia (ESSA), American College of Sports Medicine (ACSM) and the International Sports Medicine Federation (FIMS). Biokinetics address both the pathogenic and fortogenic paradigm of patient care. The purpose of this document is to standardise the professional training of Biokineticists across South African universities through the setting of minimum standards for training.

#### **2. RATIONALE FOR THE PROFESSION**

Biokinetics is a health care profession concerned with preventative, therapeutic, rehabilitative and performance-enhancing exercise modalities to optimise function, movement and sports performance across the life span. Biokineticists undertake comprehensive health, fitness, functional and clinical assessments in order to design and prescribe safe and effective exercise interventions. Biokineticists implement and supervise scientific individualised physical activity and exercise programs for apparently healthy, diseased and injured individuals throughout the human lifespan. Biokinetics forms part of a holistic and multidisciplinary approach to deliver evidence-based preventative and rehabilitative health care.

Biokinetics activities relate to human health and performance, and may be performed on apparently healthy individuals, communities and populations who have, or may develop or are recovering from impairments, activity limitations or physical activity participation restrictions. These may be related to conditions of the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, and/or immune systems, and/or conditions related to adverse effects attributable to individual personal, lifestyle and environmental factors,

The qualification will provide all economic sectors with a pool of well-qualified professionals who will be able to perform biokinetics-related health care services within any community or health setting. Biokineticists are trained to address the identification and reduction of risk factors for non-communicable diseases, as well as the promotion of health and performance using exercise and physical activity the most important treatment modality.

The professional qualification "Registered Biokineticist" is distinct from other similar qualifications in the health care profession as its main focus is using scientifically-based individualised exercise (testing and prescription) within the domains of practice as mentioned above.

The prescribed minimum training requirements will allow a graduate in Biokinetics to register with the HPCSA. Registration will enable the graduate to practice independently as a Biokineticist.

### **3. PURPOSE OF TRAINING**

The content of the course enables the acquisition of foundational and core knowledge to foster the professional abilities, skills, values and attitudes of a registered Biokineticist. Competent and qualified Biokineticists can work in a variety of settings, including the public and private sector and both urban and rural settings. Biokineticists primarily utilise their professional expertise in human movement sciences for exercise testing and prescription, physical activity and health education to enhance and promote health in general (wellness), to prevent dysfunction and disease, to restore and maintain an individual's functional ability, particularly in respect of orthopaedic conditions, chronic diseases, optimal performance and activities of daily living.

### **4. GENERAL**

#### **4.1 Minimum Entry Requirements**

Applicants wishing to enter the academic program should have a Grade 12 NQF Level 4 qualification or equivalent certificate, with University-specific exemption. Additional subject-specific requirements set by accredited tertiary institutions offering the program must also be met. These may differ between institutions; however, the following subjects are recommended:

- Mathematics
- Physical Sciences
- Life Sciences / Biology

#### **4.2 Registration with the HPCSA**

The student must register with the HPCSA for the duration of their studies. The student enrolls in their first year as a student Biokineticist (BKS), and upon completion of the qualification, the graduate may register as an independent, registered biokinetics practitioner.

#### **4.3 Course duration**

The academic program consists of four years of full-time studies at an HPCSA-accredited tertiary institution.

A graduate is entitled to apply for Post-Graduate Diploma, Master and PhD degree programs providing he/she meets the specific institutional entry requirements.

#### **4.4 Mode of delivery**

This is a full-time program that consists of theoretical, practical and clinical work-integrated learning (WIL) activities. A variety of learning and teaching methods may be utilised, including face-to-face or classroom-based, blended and online learning methodologies. Problem-based and enquiry-based learning (and similar methods) are encouraged. Group work and inter-professional training are also part of the course. Incorporating technology to increase access, optimise teaching and learning and improve service delivery is also recommended.

### **5. BROAD OUTCOMES FOR THE PROGRAM AND GRADUATES ATTRIBUTES**

The successful Biokinetics graduate must be able to:

- 5.1 Apply foundational knowledge, evaluate information, interpret and integrate information with the purpose to prescribe exercise modalities as a prevention and treatment strategy.
- 5.2 Conduct health risk screening for various population groups in a variety of settings and implement appropriate intervention/preventative programs based on the findings.
- 5.3 Conduct thorough patient assessment and interpret the results.
- 5.4 Respond to the needs of the community in terms of health, wellness and optimal function.
- 5.5 Design, implement and monitor therapeutic exercise, recreation and physical activity intervention programs, with or without the use of equipment.
- 5.6 Evaluate and reflect on the effectiveness of interventions.

- 5.7 Apply sound biomechanical principles in optimising human movement and performance across the life span.
- 5.8 Assessment of work-related demands and exercise interventions to optimise work-related performance.
- 5.9 Understand and apply basic pharmacological knowledge related to exercise testing/assessment and intervention.
- 5.10 Refer patients to relevant health professionals.
- 5.11 Function as part of a multi-disciplinary team following good clinical practice and evidence-based guidelines.
- 5.12 Conduct and interpret research within the Biokinetics scope of practice.
- 5.13 Apply evidence-based medicine as a basis for clinical reasoning.
- 5.14 Conduct the Biokinetics scope of practice in an ethical sound and responsible manner by considering the clients and community, and showing understanding and sensitivity to individuals and social-cultural differences.
- 5.15 Use appropriate technology to support Biokinetics service delivery.
- 5.16 Apply excellent communication skills (verbal and non-verbal) when engaging with patients and colleagues, including the ability to prepare written reports as required by medical schemes or legal entities.
- 5.17 Show commitment to professional self-development and self-care through engaging in educational and ongoing learning and self-reflection.
- 5.18 Engage in the building of inter-professional working relationships and mentoring of new graduates.
- 5.19 Display leadership and health advocacy qualities.
- 5.20 Apply entrepreneurial skills.
- 5.21 Show competency in presenting scientific findings to a research audience.
- 5.22 Demonstrate appropriate practice management skills.

## **6. PROGRAM REQUISITES/FUNDAMENTALS**

This section tabulates the specific outcomes of the minimum training standards required for the training of Biokineticists. The qualification consists of a minimum of 480 credits (1 credit = 10 notional hours) at an exit level of NQF level 8. The PPB board strongly recommends that programs do not exceed this by more than 5% (maximum 510 credits).

Please note that work-integrated learning (WIL) should occur throughout the four years of the program (refer to the PPB guideline for WIL – [Addendum 1](#)).



It remains the prerogative of institutions to develop their curriculum to ensure graduates exit with the necessary knowledge, skills, attitudes and behaviours as outlined in the broad outcomes above (Section 5).

**Table 1: Specific outcomes of the minimum training standards according to Credits and NQF levels.**

Specific outcomes	Credits	NQF level
7.1 Anatomy and Physiology	30	5
7.2 Psycho-social aspects of physical activity and exercise	15	5
7.3 Nutrition	15	5
7.4 Biokinetics 1: Introduction to the profession of Biokinetics	30	5
7.5 Therapeutic recreation	15	5
7.6 Work Integrated Learning 1 (WIL)	10	5
<b>Total (Level 5):</b>	<b>115</b>	
7.1 Pathology and Pathophysiology	15	6
7.2 Biomechanics	15	6
7.3 Perceptual Motor Learning and Control	10	6
7.4 Applied Exercise Physiology	30	6
7.5 Clinical Exercise Testing and Evaluation	30	6
7.6 Biokinetics 2: Wellness, Health Promotion and Disease Prevention	15	6
7.7 Work Integrated Learning 2 (WIL)	10	6
<b>Total (Level 6):</b>	<b>125</b>	
7.8 Biokinetics 3: Neuro-musculoskeletal rehabilitation	15	7
Exercise Management for Chronic Diseases and Disabilities	15	7
7.9 Clinical Exercise and Prescription	30	7
7.10 Research Methodology	15	7
7.11 Pharmacology	5	7
7.12 Work Integrated Learning 3 (WIL)	35	7
<b>Total (Level 7):</b>	<b>115</b>	<b>7</b>
7.13 Biokinetics 4: Wellness, Health Promotion and Disease Prevention	10	8
Neuro-musculoskeletal rehabilitation	10	8
Exercise Management for Chronic Diseases and Disabilities	10	8

Specific outcomes	Credits	NQF level
7.14 Practice Management & Applied Ethics	20	8
7.15 Research Project	30	8
7.16 Work Integrated Learning 4 (WIL)	45	8
<b>Total (Level 8):</b>	<b>125</b>	<b>8</b>
<b>TOTAL</b>	<b>480</b>	

\* The curriculum content must be developed based on the above specific outcomes and aligned with NQF level descriptors.

**Table 2: Broad Specific outcomes of the minimum training standards**

Specific Outcomes	Credits	NQF level
<b>7.1 Anatomy and Physiology</b>	<b>30</b>	<b>5</b>
7.1.1 Standard anatomical and physiological terminology in describing the organisation of the human body.		
7.1.2 The cellular basis of physiology, tissue and body systems.		
7.1.3 Macro- and micro-anatomy/physiology of the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, and/or immune system.		
7.1.4 The principles of support and movement integral to the human body.		
7.1.5 Homeostasis and nutrition.		
7.1.6 Reproduction, growth, development and ageing.		
7.1.7 Basic metabolic processes.		
7.1.8 Basic biochemistry.		
<b>7.2 Psycho-social aspects of physical activity and exercise</b>	<b>15</b>	<b>5</b>
7.2.1 Foundational theories about psychology and sociology in Biokinetics contexts.		
7.2.2 The human psyche and health behaviour, health promotion (wellness), human functioning and performance.		
7.2.3 Motivational and interviewing skills within a Biokinetics context.		
7.2.4 Negative psycho-social factors on the individual.		
7.2.5 Psycho-social stratification within the South African community.		
7.2.6 The different phases of grief following a catastrophic life event.		
7.2.7 Coping strategies related to pain and loss.		
7.2.8 The long-term effects of distress on health.		
7.2.9 Diversity in culture, gender, and income.		
7.2.10 Psychological aspect of sports injury and return to play.		
7.2.11 Near-death experience/window of opportunity in cardiac rehabilitation.		
<b>7.3 Nutrition</b>	<b>15</b>	<b>5</b>
7.3.1 Basic concepts of macro- and micro-nutrition.		
7.3.2 Nutritional demands for different types of exercise.		

6

Updated 22 January 2020

7.3.3 Nutritional demands in patients undergoing neuro-musculoskeletal rehabilitation.		
7.3.4 Nutritional demands in patients with chronic disease.		
7.3.5 Nutritional needs for special populations such as pregnancy, children, the elderly, and those diagnosed with depression.		
7.3.6 Evidence surrounding new trends in nutrition.		
7.3.7 Nutrition in sport and exercise recovery and optimal performance.		
<b>7.4 Biokinetics 1</b>	<b>30</b>	<b>5</b>
<b>Introduction to the profession of Biokinetics</b>		
7.4.1 Ancient and modern history of physical activity and health, including landmark research.		
7.4.2 Concepts and methods in physical activity epidemiology and disease surveillance.		
7.4.3 Origin and history of Biokinetics in SA.		
7.4.4 Professional conduct and ethics.		
7.4.5 Legal aspects.		
7.4.6 Working in a multi-disciplinary team.		
7.4.7 Scope of practice.		
7.4.8 Introduction to Total Wellness.		
7.4.9 Introduction to Chronic Diseases & -Conditions.		
7.4.10 Introduction to muscular-skeletal health: Injury prevention, identification and common conditions		
7.4.11 Introduction to Measurement and Evaluation.		
7.4.12 Introduction to Exercise Prescription.		
<b>7.5 Therapeutic Recreation</b>	<b>15</b>	<b>5</b>
7.5.1 Historical development of therapeutic recreation.		
7.5.2 Evidence-based models and approaches to practice.		
7.5.3 Assessment and documentation in therapeutic recreation.		
7.5.4 Development of therapeutic interventions programs for apparently healthy and special populations.		
7.5.5 Leisure education and elimination of barriers to participation.		
7.5.6 Adherence to interventions, specifically to therapeutic exercise from a behavioural change perspective.		
7.5.7 Group dynamics vs individual rehabilitation.		
<b>7.6 Work Integrated Learning 1 (WIL)</b>	<b>15</b>	<b>5</b>
7.6.1 Complete 100 hours of WIL.		
7.6.2 Experience in the clinical field of Biokinetics through observation, participation and workplace-based learning.		
7.6.3 Portfolio of evidence documenting clinical experiences and case studies.		
7.6.4 Practical physical fitness and health assessments; prescription and monitoring of individual and group exercise programs (including therapeutic recreation) in apparently healthy or low-risk individuals.		
7.6.5 Critical reflection on own experiences.		
7.6.6 Practice management skills and competencies.		
7.6.7 Ethical behaviour and adherence to the biokineticist's scope of practice.		
7.6.8 Legal compliance within the profession of Biokinetics.		

7.6.9 Practical application of theoretical knowledge, values and behaviours in the field of Biokinetics.		
7.6.10 BLS level 1 certification inclusive of CPR and AED protocols.		
<b>7.7 Pathology and Pathophysiology</b>	<b>15</b>	<b>6</b>
7.7.1 The epidemiology of common diseases.		
7.7.2 The terminology used within pathophysiology.		
7.7.3 Pathogens and disease.		
7.7.4 The immune system.		
7.7.5 Wound healing and pain.		
7.7.6 Acute and chronic inflammation.		
7.7.7 The risk factors, causes, pathophysiology, symptoms, management and treatment for: neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, and/or immune conditions/diseases.		
7.7.8 The possible role of exercise in treating or managing these conditions.		
7.7.9 Common medications used to treat these diseases or conditions.		
<b>7.8 Biomechanics</b>	<b>15</b>	<b>6</b>
7.8.1 Biomechanics terminology.		
7.8.2 Dynamic, muscle function, movement biomechanics, integrative functioning of the neuromuscular and musculoskeletal systems in exercise and physical activity programs.		
7.8.3 The different planes of movement and the different axis used to describe human movement.		
7.8.4 Musculoskeletal biomechanics and pathomechanics.		
7.8.5 Newtonian principles when analysing human movement.		
7.8.6 Calculations related to force, work, power and energy.		
7.8.7 The different types of forces that may act on the human body, including torque and lever and pulley systems.		
7.8.8 The principles related to movement through the air and water mediums.		
7.8.9 Different methods to perform vector analysis.		
7.8.10 The factors that determine balance and stability (global and local stabilisers).		
7.8.11 Kinematic and kinetic analyses on linear and angular movements for the development of corrective interventions.		
7.8.12 Different types of muscle contractions, i.e. isometric, isotonic, isokinetic and plyometric contractions, open- and closed kinetic chain movements, non-weight-bearing, partial weight-bearing and full weight-bearing movements.		
7.8.13 Anatomical analyses of both isolated and integrated movements as well as common exercises and simple sporting manoeuvres.		
7.8.14 Qualitative biomechanical analyses on basic resistance exercises and common sporting techniques.		
7.8.15 External and internal forces and muscular imbalances on posture, movement injuries and general health.		
7.8.16 The principles of optimal flexibility, muscle strength and proprioception on static and dynamic postures.		
7.8.17 Identify and correct abnormal posture and gait patterns through appropriated feedback, and corrective exercises.		

<b>7.9 Perceptual Motor Learning and Control</b>	<b>10</b>	<b>6</b>
<p>7.9.1 Human growth, development, maturation and ageing to a variety of Biokinetics contexts.</p> <p>7.9.2 The different factors that can influence the perceptual-motor development of human skills.</p> <p>7.9.3 Gross and fine motor development.</p> <p>7.9.4 The structure and function of the central nervous system as it relates to human functioning in Biokinetics context.</p> <p>7.9.5 Neuromuscular control for rehabilitation and body posture.</p> <p>7.9.6 Fundamental motor development and perceptual-motor development theories and concepts to a variety of contexts.</p> <p>7.9.7 Motor development and perceptual-motor development evaluation and interventions.</p> <p>7.9.8 Normal and abnormal human movement patterns in relation to neuromuscular functioning (e.g. gait).</p> <p>7.9.9 The interrelationship between physical activity, fitness, functional constraints and perceptual-motor development and neurological aspects of motor control over the lifespan to the rehabilitation of human motor behaviour.</p>		
<b>7.10 Applied Exercise Physiology</b>	<b>30</b>	<b>6</b>
<p>7.10.1 The human body's acute responses and chronic adaptation to physical activity, exercise and exercise training in the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, endocrine, and auto-immune system(s).</p> <p>7.10.2 The bioenergetics related to different modes of exercise.</p> <p>7.10.3 The acute and chronic responses and adaptations associated with exercising in the heat, cold, high altitude, other environmental factors, diving and space.</p> <p>7.10.4 The differences in exercise responses and adaptations according to gender and age.</p> <p>7.10.5 Applied biochemistry in exercise and training.</p> <p>7.10.6 Exercise testing and interpretation of:</p> <p>7.10.6.1 Body composition, e.g. body fat percentage</p> <p>7.10.6.2 Musculoskeletal system, e.g. flexibility, proprioception, strength (isometric, isotonic and isokinetic), speed, power and muscle endurance.</p> <p>7.10.6.3 Cardio-respiratory system, e.g. blood pressure, lung function, and <math>VO_{2max}</math>.</p> <p>7.10.6.4 Anaerobic capacity.</p> <p>7.10.6.5 Biochemical aspects, e.g. blood glucose, cholesterol and lactate threshold.</p> <p>7.10.6.6 Resting and exercise ECG.</p> <p>7.10.6.7 Muscle activity and biofeedback with EMG.</p> <p>7.10.6.8 Nutritional and hydration status.</p>		
<b>7.11 Clinical Exercise Testing and Evaluation</b>	<b>30</b>	<b>6</b>
<p>7.11.1 Exercise pre-participation health screening and physical activity readiness.</p> <p>7.11.2 Health-related physical fitness and functional movement assessment and interpretation.</p>		

7.11.3 Clinical exercise testing, interpretation and patient feedback and education.		
7.11.4 General and advanced principles of exercise prescription and how to apply general principles of exercise prescription.		
7.11.5 The application of ergometric, isokinetic, isotonic, isometric, electromyographic, electrocardiographic, electrophysical, cardiopulmonary, spirometric, anthropometric, photographic, videographic, biochemical, metabolic and biomechanical modalities.		
7.11.6 Case studies on clinical exercise testing and evaluation.		
<b>7.12 Biokinetics 2</b>		
<b>7.12.1 Wellness, Health Promotion and Disease Prevention</b>	<b>15</b>	<b>6</b>
7.12.1. Total wellness and physical wellness.		
7.12.2. The components of total wellness.		
7.12.3. The wellness continuum.		
7.12.4. The role of an inactive or a sedentary lifestyle on disease patterns (epidemiology) internationally and in SA.		
7.12.5. The role of regular exercise and physical activity in promoting health and preventing disease (NCDs).		
7.12.6. International and national trends related to health promotion (e.g. Exercise is Medicine, Millennium Development Goals, Vitality and WOW).		
7.12.7. Behavioural theories and strategies for promoting exercise.		
7.12.8. Benefits and risks associated with physical activity		
7.12.9. Exercise prescription for healthy populations and special populations:		
7.12.9.1. Children and Adolescents		
7.12.9.2. Non-specific low back pain		
7.12.9.3. Older adults		
7.12.9.4. Pregnancy		
7.12.9.5. Special needs: e.g. paraplegics and amputees		
7.12.10 Theoretical foundations for understanding exercise behaviour:		
7.12.10.1. Social Cognitive Theory		
7.12.10.2. Transtheoretical Model		
7.12.10.3. Self-Determination Theory		
7.12.10.4. Theory of Planned Behaviour		
7.12.10.5. Social-Ecological Models		
7.12.10.6. Decreasing Barriers to Physical Activity		
7.12.11 Cognitive and behavioural strategies for increasing physical activity behaviour:		
7.12.11.1. Enhancing Self-Efficacy		
7.12.11.2. Goal Setting		
7.12.11.3. Reinforcement		
7.12.11.4. Social Support		
7.12.11.5. Self-Monitoring		
7.12.11.6. Problem Solving		
7.12.11.7. Relapse Prevention		
7.12.12 Theoretical strategies and approaches to increase exercise adoption and adherence:		
7.12.12.1. Brief Counselling and Motivational Interviewing		

<p>7.12.12.2. Stages of Change Tailored Counselling 7.12.12.3. Group Leader Method</p> <p>7.12.13 Assessment of disabilities to perform functional tasks and the type of exercises to prescribe in order to improve or alter functional ability.</p> <p>7.12.14 Therapeutic recreation as an intervention tool for different populations.</p> <p>7.12.15 Therapeutic recreation evaluation protocols and programs for different individuals and groups in therapeutic and recreational contexts, and programs for different groups/populations.</p> <p>7.12.16 Physical activity and regular exercise in the promotion of health and the utilisation of recreation programs to promote health.</p>		
<b>7.13 Work Integrated Learning 2 (WIL)</b>	<b>10</b>	<b>6</b>
<p>7.13.1 Complete 100 hours of WIL.</p> <p>7.13.2 Experience in the clinical field of Biokinetics through observation, participation and workplace-based learning.</p> <p>7.13.3 Portfolio of evidence documenting clinical experiences and case studies.</p> <p>7.13.4 Practical physical fitness and health assessments; prescription and monitoring of individual and group exercise programs in apparently healthy or low-risk individuals.</p> <p>7.13.5 Critical reflection on own experiences.</p> <p>7.13.6 Practice management skills and competencies.</p> <p>7.13.7 Ethical behaviour and adherence to the Biokineticist's scope of practice.</p> <p>7.13.8 Legal compliance within the profession of Biokinetics.</p> <p>7.13.9 Practical application of theoretical knowledge, values and behaviours in the field of Biokinetics.</p> <p>7.13.10 BLS level 1 certification.</p>		
<b>7.14 Biokinetics 3</b>		
<p><b>7.14.1 Neuro-musculoskeletal Rehabilitation</b></p> <p>7.14.1.1. The basic understanding of incidence, symptoms, and aetiology of specific orthopaedic injuries/conditions.</p> <p>7.14.1.2. Medical and injury histories of a variety of patients.</p> <p>7.14.1.3. Specialised manual evaluation techniques in assessing an individual's injury.</p> <p>7.14.1.4. Advanced exercise testing equipment and techniques to assess individuals with different injuries.</p> <p>7.14.1.5. Signs and symptoms indicating emergency medical attention, further investigation or referral of the patient.</p> <p>7.14.1.6. Report writing and referral.</p> <p>7.14.1.7. Apply biomechanical knowledge to the development and implementation of appropriate and scientifically-based exercise programs.</p> <p>7.14.1.8. Apply evidence-based criteria for successful discharge of a rehabilitated patient within the criteria.</p>	<b>15</b>	<b>7</b>
<p><b>7.14.2 Exercise Management of Chronic Diseases and Disabilities</b></p> <p>7.14.2.1. The interrelationship between the incidence, aetiology and pathophysiology of various chronic diseases and disabilities.</p>	<b>15</b>	<b>7</b>

7.14.2.2. The role of exercise testing and prescription in the management of different chronic diseases and disabilities. 7.14.2.3. Individually based risk stratification. 7.14.2.4. Techniques to assess the conditions of chronic diseases or disabilities. 7.14.2.5. Special investigation methods used in chronic diseases and disabilities. 7.14.2.6. Exercise intervention programs for various chronic diseases and disabilities. 7.14.2.7. Report writing, patient education and or referral.		
<b>7.15 Clinical Exercise and Prescription</b>	<b>30</b>	<b>7</b>
7.15.1 The benefits of regular exercise in the injured (MSK), diseased populations (chronic disease), including special populations like children, pregnant women and the frail/elderly and those diagnosed with depression. 7.15.2 Clinical exercise testing in a variety of populations. 7.15.3 Design and prescribe therapeutic exercise programs in a variety of injured or diseased populations. 7.15.4 Monitor the effectiveness of exercise interventions to ensure successful management of patients' conditions. 7.15.5 Apply appropriate strategies to ensure progression and adherence to interventions.		
<b>7.16 Research Methodology</b>	<b>15</b>	<b>7</b>
7.16.1 Research methods and concepts used in research, a variety of approaches and techniques of research methods, data collection as well as data analysis. 7.16.2 Qualitative and quantitative research methods. 7.16.3 Secondary sources and research. 7.16.4 Design and conduct own research projects. 7.16.5 Critical concepts of relevant theories, research methods and techniques to identify and resolve complex real-life problems. 7.16.6 Literature review using a variety of sources. 7.16.7 Data collection of sport-specific and physical activity and health measurements. 7.16.8 Data analyses: parametric and non-parametric statistical analyses. 7.16.9 Interpretation of research findings. 7.16.10 Writing and presentation of research reports, journal articles, posters and oral presentations.		
<b>7.17 Pharmacology</b>	<b>5</b>	<b>7</b>
7.17.1 Basic concepts of pharmacology: Pharmacodynamics and introductory pharmacology 7.17.2 Drug classes used for the management of diseases related to the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, endocrine, and immune system(s). 7.17.3 Pharmacological effects of medications on physiological functions and how these effects influence the ability to exercise. 7.17.4 Pharmacokinetics. 7.17.5 Side-effects of drugs commonly prescribed in diseases of lifestyle and MSK injuries.		



7.17.6 The knowledge of treatment and appropriate use of various drugs prescribed for the treatment of injuries and chronic disease. 7.17.10 Adapting exercise assessment, prescription and exercise monitoring for patients on specific drugs.		
<b>7.18 Work Integrated Learning 3 (WIL)</b>	<b>35</b>	<b>7</b>
7.18.1 Complete 350 hours of WIL. 7.18.2 Experience in the clinical field of Biokinetics through observation, participation and workplace-based learning. 7.18.3 Portfolio of evidence documenting clinical experiences and case studies. 7.18.4 Practical physical fitness and health assessments; prescription and monitoring of individual and group exercise programs in common conditions or moderate-risk individuals. 7.18.5 Critical reflection on own experiences. 7.18.6 Practice management skills and competencies. 7.18.7 Ethical behaviour and adherence to the biokineticist's scope of practice. 7.18.8 Legal compliance within the profession of Biokinetics. 7.18.9 Practical application of theoretical knowledge, values and behaviours in the field of Biokinetics. 7.18.10 BLS level 1 certification.		
<b>7.19 Biokinetics 4</b>		
<b>7.19.1 Wellness, Health Promotion and Disease Prevention</b> 7.19.1.1 Implementation of different wellness initiatives. 7.19.1.2 Complex problem base/case base diseases / conditions and Journal Club.	<b>10</b>	<b>8</b>
<b>7.19.2 Neuro-musculoskeletal rehabilitation</b> 7.19.2.1 Advanced assessment techniques within MSK. 7.19.2.2 Advanced rehabilitation techniques within MSK. 7.19.2.3 Rehabilitation following standard surgical procedures in orthopaedics. 7.19.2.4 Return to play/sport protocols. 7.19.2.5 Complex problem base/case base diseases / conditions and Journal Club.	<b>10</b>	<b>8</b>
<b>7.19.3 Exercise Management for Chronic Diseases and Disabilities</b> 7.19.3.1 Advanced assessment techniques within chronic diseases and conditions. 7.19.3.2 Advanced rehabilitation techniques within chronic diseases and conditions. 7.19.3.3 Rehabilitation following standard surgical and other procedures in chronic diseases and conditions. 7.19.3.4 Complex problem base/case base diseases / conditions and Journal club.	<b>10</b>	<b>8</b>
<b>7.20 Practice Management and Ethics</b>	<b>20</b>	<b>8</b>
7.20.1 The scope of practice and ethical rules concerning Biokinetics. 7.20.2 A business plan for setting up a practice. 7.20.3 Different business models and apply and adopt different economic		

<p>models as used in other countries to contexts in South Africa.</p> <p>7.20.4 Marketing of a Biokinetics practice.</p> <p>7.20.5 Health policy, health systems and structures, capacity building and interdisciplinary healthcare as required in South African legislation.</p> <p>7.20.6 Diagnostic and procedure codes</p> <p>7.20.7 Rules and regulations of Biokinetics practice, the scope of Biokinetics practice and ethical rules formulated by the Health Professions Council of South Africa.</p> <p>7.20.8 Layout of the facility and apply safety principles.</p> <p>7.20.9 Management and maintenance of the equipment in a Biokinetics practice.</p> <p>7.20.10 Strategic planning skills and knowledge in a biokinetics context.</p> <p>7.20.11 Financial aspects of a Biokinetics practice.</p> <p>7.20.12 Human resources and supervise programs, individuals, teams and subordinates within the value system of the profession.</p> <p>7.20.13 Entrepreneurial skills in establishing and managing of a Biokinetics practice and skill required for entrepreneurship.</p> <p>7.20.14 Basic management functions and competencies in private and public biokinetic practice/health care facility contexts.</p>		
<b>7.21 Research Project</b>	<b>30</b>	<b>8</b>
<p>7.21.1 Identify a Biokinetics related problem and derived a relevant research question based on current literature and drafting a proposal.</p> <p>7.21.2 Conduct a research project that will be documented as a scientific article or a research report.</p> <p>7.21.3 Apply applicable research methods, techniques, analyses and technology in an ethical and responsible way.</p> <p>7.21.4 Perform appropriate data analyses to achieve the outcomes of the research.</p> <p>7.21.5 Interpret and discuss research findings.</p> <p>7.21.6 Communicate research findings.</p> <p>7.21.7 Appreciate the components of scholarly writing and evaluate its quality.</p>		
<b>7.22 Work Integrated Learning 4 (WIL)</b>	<b>45</b>	<b>8</b>
<p>7.22.1 Complete 450 hours of WIL.</p> <p>7.22.2 Experience in the clinical field of Biokinetics through observation, participation and workplace-based learning.</p> <p>7.22.3 Portfolio of evidence documenting clinical experiences and case studies.</p> <p>7.22.4 Practical physical fitness and health assessments; prescription and monitoring of individual and group exercise programs in complex cases or high-risk individuals.</p> <p>7.22.5 Critical reflection on own experiences.</p> <p>7.22.6 Practice management skills and competencies.</p> <p>7.22.7 Ethical behaviour and adherence to the Biokineticist's scope of practice.</p> <p>7.22.8 Legal compliance within the profession of Biokinetics.</p> <p>7.22.9 Practical application of theoretical knowledge, values and behaviours in the field of Biokinetics.</p> <p>7.22.10 BLS level 1 certification with CPR and AED protocols</p>		

<b>TOTAL</b>	<b>480</b>	
--------------	------------	--

## 8. QUALITY ASSURANCE

- 8.1 Quality assurance measures should be aligned with the institutional policy, and the program must be **accredited** by the PPB Board of the HPCSA, a process that occurs every five years.
- 8.2 Lecturers lecturing and assessing biokinetics specific content and or involved in clinical training must comply with all requirements for annual registration with the HPCSA and be registered as a Biokineticist with the HPCSA.
- 8.2.1 It is recommended that lecturers (including external lecturers and clinical supervisors) have a master's degree and/or at least three years of clinical experience; and
- 8.2.2 should demonstrate CPD and ongoing development in teaching and learning
- 8.2.3 **Performance appraisal** for all lecturers/educators (360° recommended)
- 8.2.4 Lecturer/educator peer assessment (voluntary but recommended especially for new lecturers/ educators)
- 8.3 **Comprehensive study guides** in which exit outcomes, the learning activities, tests and/or examination processes and promotion criteria are clearly indicated, must be available to all students before the start of any module/course.
- 8.4 **Student feedback** must be sought
- 8.4.1 Per module (at least every two years for existing modules and with new modules/ courses must be conducted within the first year)
- 8.4.2 Lecturer feedback (every 1 - 2 years)
- 8.4.3 Program feedback (this occurs at the end of the fourth/final year and if possible repeated 6-12 months after graduation)
- 8.5 **Lecturer to student ratio:**
- 8.5.1 Theory only - this will depend on mode/method of delivery, the resources and space available
- 8.5.2 Theory and practical demonstrations - a ratio of no more than 1:25 is recommended
- 8.5.3 Theory and group work (e.g. problem-based learning) - a ratio of 1:15 is recommended
- 8.5.4 Practical/tutorials - a ratio of 1:20 is recommended
- 8.5.5 Clinical setting - a ratio of 1:5 is recommended (but this can vary based on the nature of pedagogy and clinical setting)
- 8.6 Students must work under **supervision** by a registered Biokineticist. Refer to the guidelines for placements without a qualified Biokineticist (Addendum 2)

**8.7 Assessment:**

**8.7.1 Internal moderation**

All summative assessments must be moderated (i.e. checked for alignment with module outcomes and to ensure the editorial quality) in line with the institutional policy.

**8.7.2 External moderation**

8.7.2.1 All exit level module outcomes (i.e. all NQF 8 exit level modules) and all final year courses/modules must be externally moderated (i.e. checked for alignment with module and program outcomes; and that assessments validity and reliability)

8.7.2.2 All students should be seen (at least in part) by an external examiner [note that an external moderator should not be considered a "second examiner" although may fulfil dual roles)

**8.8 Facilities:**

These must be adequately equipped and maintained to deliver the program, i.e. meet the program and course/module outcomes and comply with basic health and safety regulation.

## Addendum 1

# PPB BOARD GUIDELINES FOR WORK INTEGRATED LEARNING (WIL) IN B DEGREE (PROFESSIONAL) PROGRAMS

### BACKGROUND:

The CHE in their guideline document<sup>1</sup> for Work integrated learning (WIL) states that “university teachers should think carefully about the relationship between the workplace and the university. A university education is not about job training, and a WIL curriculum should not be dictated by economic or narrow workplace interests. Instead the university must be (as it always has been) responsive to society and responsive to the needs of students to become productive members of society. Beyond that, part of the mission of higher education has also been to look beyond immediate problems and to prepare students to change and improve existing practices, not merely to adapt to the world as they find it”.

### DEFINITION:

**WIL** is used as an umbrella term to describe curricular, pedagogic and assessment practices, across a range of academic disciplines that integrate formal learning and workplace concerns and includes **classroom-based and workplace-based forms of learning** that are appropriate for the professional qualification. Academic and workplace practices are **aligned for the mutual benefit of students and workplaces**<sup>1</sup>.

### APPROACHES:

The integration of theory and practice in student learning can occur through a range of WIL approaches. WIL is primarily intended to enhance student learning, and **should respond to concerns about gradueness, employability and civic responsibility**. Examples include: action-learning, apprenticeships, cooperative education, experiential learning, inquiry learning, inter-professional learning, practicum placements, problem-based learning, project-based learning, scenario learning, service-learning, team-based learning, virtual or simulated WIL, work-based learning, work experience, workplace learning, etc. (refer to CHE’s WIL Good Practice Guide for definitions of these terms p:71-77).

### *Where does it fit and what are the HPCSA minimum requirements?*

It is important to note that WIL should occur **throughout the four years** of the program. Typically, the earlier years will focus more on knowledge and clinical skills acquisition/training which can be practiced on healthy models/ peers in laboratories or in virtual or simulated environments or in work-place settings. Transition from theory to practice can be facilitated in many ways through for e.g. problem-based, scenario-based and enquiry-based learning which may occur in the classroom and/or the clinical/workplace environments. The further development of graduate attributes, also referred to a ‘critical skills’ and professional competencies, should occur in workplace (real world) settings.

The PPB board does not stipulate the minimum no of hours to be spent on skills acquisition/training. There is a common understanding however that whichever learning strategy is used for this, the teaching and learning and assessment practice ensures that students are competent to apply these to patients/ clients in real world/ workplace settings. The minimum requirements for workplace-based learning (WPBL) however are specified.

17

Updated 22 January 2020

**For a 4-year professional program:**

Year	Hours	Remuneration
> year 3 & 4	1 000*	unpaid

\* hours allocated per year is not specified (and some of the clinical hours may be offered in Years 1 & 2)

For Physiotherapy, a year of Community Service (paid) is required before graduates can register as professionals with the HPCSA.

Currently this requirement does not exist for Biokinetics or Podiatry graduates.

**For the Biokinetics 3+1 year programs:**

Year	Hours	Remuneration
Year 1 (honours year)	500hr (clinical rotations)	unpaid
Year 2 (internship)	800hrs (fulltime 12-month placement)	paid

**Outcomes:**

The outcomes for WPBL must be clear and the teaching and learning activities, exposure and assessment aligned with these outcomes.

The clinical or workplace setting should:

- ensure that students have adequate exposure
- ensure that students have equivalent exposure (*it is recognised that not all students can work in all the same settings*)
- allows for development of well-rounded healthcare professional (includes the development of graduate attributes and/or critical competencies (e.g. communicator; scholar, professional, collaborator, health advocate)

**Assessment:**

The following are recommended for assessment in WPBL:

- Regular formative and summative assessment (e.g. demonstration of practical skills (DOPS), mini clinical exam (mini-CEX), case discussions, 'setting specific exit' exam/ assessment)
- Portfolio – demonstrating student's growth across the 1000hrs
- Exit exam (which is externally moderated)

The following are **recommended for further reading:**

1. Council for Higher Education: Work Integrated Learning: a good practice guide (2011). [https://www.che.ac.za/sites/default/files/publications/Higher\\_Education\\_Monitor\\_12.pdf](https://www.che.ac.za/sites/default/files/publications/Higher_Education_Monitor_12.pdf)
2. Yousuf Guraya, S. (2015). Workplace-based Assessment; Applications and Educational Impact. *The Malaysian Journal of Medical Sciences: MJMS*, 22(6), 5–10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5295751/>
3. Buckley, S. et al. (2009). The educational effects of portfolios on undergraduate student learning: A best evidence medical education (BEME) systematic review. *BEME guide no. 11. Medical Teacher*, 31(4), 282-298. doi:10.1080/01421590902889897 <http://www.tandfonline.com/doi/full/10.1080/01421590902889897>
4. Liu, C. (2012). An introduction to workplace-based assessments. *Gastroenterology and Hepatology from Bed to Bench*, 5(1), 24–28. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4017451/>

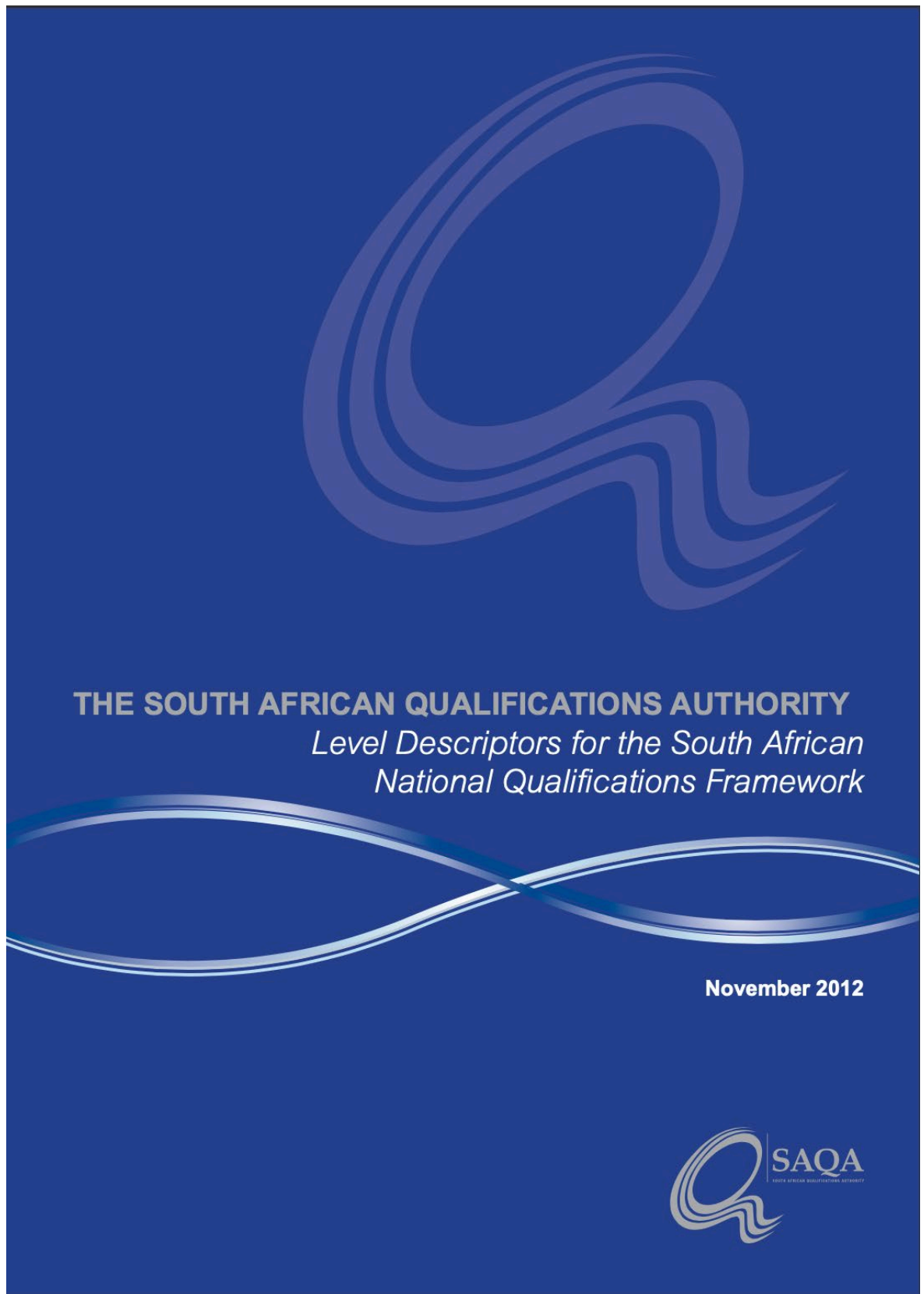
Appendix 2: Example WIL Examination.



## Appendix 3: Module Descriptor for Biokinetics Practice 1

## Appendix 4: Module Design Biokinetics Practise 1

Appendix 5: The South African Qualifications Authority, Level Descriptors for the South African National Qualifications Framework.



### **Copyright**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the South African Qualifications Authority (SAQA).

**Compiled by Directorate: Registration and Recognition and distributed by the Directorate: Strategic Support, SAQA.**

**Publication date:** November 2012  
**ISBN:** 978-0-9869808-9-3

Postnet Suite 248  
Private Bag X06  
Waterkloof  
0145

**Helpdesk:** +27 (0) 86 010 3188  
**Facsimile:** +27 (0) 12 431 5039  
**Website:** [www.saqa.org.za](http://www.saqa.org.za)  
**E-mail:** [saqainfo@saqa.org.za](mailto:saqainfo@saqa.org.za)



## Contents

<b>List of abbreviations</b> .....	1
<b>Foreword</b> .....	2
<b>Level Descriptors for the South African National Qualifications Framework</b> .....	3
<b>Purpose and philosophical underpinning</b> .....	3
<b>Definitions</b> .....	3
<b>Contextual application of the level descriptors</b> .....	4
<b>Level descriptors</b> .....	5
NQF Level One .....	5
NQF Level Two .....	6
NQF Level Three .....	6
NQF Level Four .....	7
NQF Level Five .....	8
NQF Level Six .....	9
NQF Level Seven .....	10
NQF Level Eight .....	10
NQF Level Nine .....	11
NQF Level Ten .....	12
<b>Review period</b> .....	13
<b>Short title</b> .....	13

## List of abbreviations

<b>NQF</b>	National Qualifications Framework
<b>RPL</b>	Recognition of Prior Learning
<b>SAQA</b>	South African Qualifications Authority





## Foreword

The Level Descriptors were developed by SAQA and agreed to by the Quality Councils (Council on Higher Education; General and Further Education and Training Quality Council (Umalusi) and the Quality Council for Trades and Occupations). They were published in the government gazette in November 2011. Their primary focus is qualifications experts who are involved in developing and implementing the South African NQF. Others who will benefit from the Level Descriptors are the users including learners and skills development practitioners. The Level Descriptors focus on the challenges involved in taking the objectives of the NQF forward at national level.

The NQF Act, No 67 of 2008, makes provision for a ten-level framework where levels of learning achievement are arranged in ascending order from one to ten. One of the ways through which SAQA aims to advance the objectives of the NQF, in establishing a single integrated national framework for learning achievement, is the Level Descriptors.

An important purpose of the Level Descriptors is to support the design and implementation of qualifications and part qualifications within the NQF. They have been designed to contribute to coherence in learning achievement and facilitate evaluation criteria for comparability and thus articulation within the NQF.

Quality Councils, who recommend qualifications for registration on the NQF, must use the NQF Level Descriptors as a key reference in a transparent manner.

The Level Descriptors reflect a broad agreement on the potential benefits of the South African NQF for promoting lifelong learning.

**Joe Samuels**  
Chief Executive Officer  
SAQA



# Level Descriptors for the South African National Qualifications Framework

## Purpose and philosophical underpinning

1. The purpose of level descriptors for Levels One to Ten of the National Qualifications Framework is to ensure coherence in learning achievement in the allocation of qualifications and part qualifications to particular levels, and to facilitate the assessment of the national and international comparability of qualifications and part qualifications.
2. In order to advance the objectives of the NQF, the South African Qualifications Authority is responsible for the development of the content of the level descriptors for each level of the NQF in agreement with the three Quality Councils: The Council on Higher Education, Umalusi and the Council for Trades and Occupations.
3. The philosophical underpinning of the National Qualifications Framework and the level descriptors is applied competence, which is in line with the outcomes-based theoretical framework adopted in the South African context.
4. Ten categories are used in the level descriptors to describe applied competencies across each of the ten levels of the National Qualifications Framework:
  - Scope of knowledge
  - Knowledge literacy
  - Method and procedure
  - Problem solving
  - Ethics and professional practice
  - Accessing, processing and managing information
  - Producing and communicating of information
  - Context and systems
  - Management of learning
  - Accountability.

## Definitions

5. In these level descriptors any word or expression to which a meaning has been assigned in the National Qualifications Framework Act (Act 67 of 2008) shall have such meaning unless the context indicates otherwise. A basic set of definitions is given below, while further definitions and help in the interpretation of particular words or phrases used in the level descriptors are given in separate guidelines which will be developed by each of the Quality Councils.
6. “Applied competence” has three constituent elements: foundational competence embraces the intellectual/academic skills of knowledge together with analysis, synthesis and evaluation, which includes information processing and problem solving; practical competence includes the concept of operational context; and reflexive competence incorporates learner autonomy.
7. “Field” means a particular area of learning used as an organising mechanism for the NQF.

8. "Level" means one of the series of levels of learning achievement arranged in ascending order from one to ten according to which the NQF is organised and to which qualification types are pegged.
9. "Level descriptor" means that statement describing learning achievement at a particular level of the NQF that provides a broad indication of the types of learning outcomes and assessment criteria that are appropriate to a qualification at that level.
10. "National Qualifications Framework" is a comprehensive system approved by the Minister for the classification, registration, publication and articulation of quality assured national qualifications.
11. "Sub-framework" means one of three coordinated qualifications sub-frameworks which make up the NQF as a single integrated system: The Higher Education Qualifications Sub-Framework, the General and Further Education and Training Sub-Framework and the Occupational Qualifications Sub-Framework.

### Contextual application of the level descriptors

12. The following principles underpin the application of the level descriptors across the three sub-frameworks of the NQF:
  - There is one common set of level descriptors for the NQF to be used in different contexts
  - The level descriptors incorporate ten competencies
  - The level descriptors are designed to meet the needs of academic as well as occupational qualifications
  - There must be correlation between qualification levels and occupational levels in the world of work
  - The Critical Cross-Field Outcomes of SAQA are embedded in the level descriptors
  - Level descriptors are cumulative i.e. there is progression in the competencies from one level to the next
  - Level descriptors are applicable to the Recognition of Prior Learning (RPL)
  - Level descriptors are descriptive and not prescriptive
  - The nomenclature for qualifications is dealt with in the sub-frameworks of the NQF.
13. Level descriptors embrace learning in a wide variety of contexts (vocational, occupational, academic and professional) and environments (classroom, laboratory, field, clinic, community, etc.). Contextual interpretation of the level descriptors within each of the three sub-frameworks across academic, professional and occupational contexts is encouraged. In this regard, separate guidelines will be developed for each sub-framework.
14. Level descriptors provide a scaffold from which more specific descriptors can be developed by a variety of different sectors and practitioners, for example discipline- or profession-based. It is also recognised that in the processes of curriculum design and development, the interpretation of these generic level descriptors will be influenced by, for example, field-, discipline- and context-specific nuances.
15. The nomenclature for qualifications is dealt with in the sub-frameworks of the NQF.
16. Level descriptors are designed to act as a guide and a starting point for, *inter alia*:
  - Writing learning outcomes and associated assessment criteria for qualifications and part qualifications



- Pegging a qualification at an appropriate level on the NQF, used together with purpose statements, outcomes and assessment criteria
- Assisting learners to gain admission through RPL at an appropriate level on the NQF
- Making comparisons across qualifications in a variety of fields and disciplines pegged at the same level of the NQF
- Programme quality management, used together with purpose statements, outcomes and assessment criteria.

17. Level descriptors provide a broad indication of learning achievements or outcomes that are appropriate to a qualification at that level.
18. The competencies listed at a particular level in the framework broadly describe the learning achieved at that level, but an individual learning programme may not necessarily meet each and every criterion listed.
19. Level descriptors do not describe years of study.
20. In the level descriptors, the accessing, analysing and managing of information and communication in terms of reading, listening and speaking will, where applicable, include Braille and sign language to accommodate learners with special needs. In the case of sign language, listening and speaking refer to receptive and productive language use.

### Level descriptors

21. The following level descriptors describe the learning achievement at a particular level of the NQF that provides a broad indication of the learning achievements or outcomes that are appropriate to a qualification at that level.

#### 22. NQF Level One

- a. Scope of knowledge, in respect of which a learner is able to demonstrate a general knowledge of one or more areas or fields of study, in addition to the fundamental areas of study.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding that knowledge in a particular field develops over a period of time through the efforts of a number of people, and often through the synthesis of information from a variety of related sources and fields.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to use key common tools and instruments, and a capacity to apply him/herself to a well-defined task under direct supervision.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to recognise and solve problems within a familiar, well-defined context.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to identify and develop own personal values and ethics, and the ability to identify ethics applicable in a specific environment.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to recall, collect and organise given information clearly and accurately, sound listening and speaking (receptive and productive language use), reading and writing skills, and basic numeracy skills including an understanding of symbolic systems.

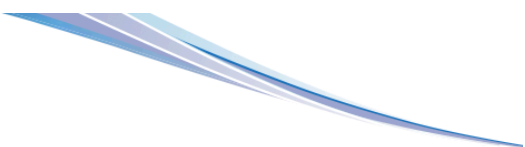
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to report information clearly and accurately in spoken/signed and written form.
- h. Context and systems, in respect of which a learner is able to demonstrate an understanding of the context within which he/she operates.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to sequence and schedule learning tasks, and the ability to access and use a range of learning resources.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to work as part of a group.

**23. NQF Level Two**

- a. Scope of knowledge, in respect of which a learner is able to demonstrate a basic operational knowledge of one or more areas or fields of study, in addition to the fundamental areas of study.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding that one's own knowledge of a particular field or system develops through active participation in relevant activities.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to use a variety of common tools and instruments, and a capacity to work in a disciplined manner in a well-structured and supervised environment.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to use own knowledge to select and apply known solutions to well-defined routine problems.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to apply personal values and ethics in a specific environment.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to apply literacy and numeracy skills to a range of different but familiar contexts.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the basic ability to collect, organise and report information clearly and accurately, and the ability to express an opinion on given information clearly in spoken/signed and written form.
- h. Context and systems, in respect of which a learner is able to demonstrate an understanding of the environment within which he/she operates in a wider context.
- i. Management of learning, in respect of which a learner is able to demonstrate the capacity to learn in a disciplined manner in a well-structured and supervised environment.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to manage own time effectively, the ability to develop sound working relationships, and the ability to work effectively as part of a group.

**24. NQF Level Three**

- a. Scope of knowledge, in respect of which a learner is able to demonstrate a basic understanding of the key concepts and knowledge of one or more fields or disciplines, in addition to the fundamental areas of study.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding that knowledge in a field can only be applied if the knowledge, as well as its relationship to other relevant information in related fields, is understood.

- 
- c. Method and procedure, in respect of which a learner is able to demonstrate operational literacy, the capacity to operate within clearly defined contexts, and the ability to work within a managed environment.
  - d. Problem solving, in respect of which a learner is able to demonstrate the ability to use own knowledge to select appropriate procedures to solve problems within given parameters.
  - e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to comply with organisational ethics.
  - f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the basic ability to summarise and interpret information relevant to the context from a range of sources, and the ability to take a position on available information, discuss the issues and reach a resolution.
  - g. Producing and communicating information, in respect of which a learner is able to produce a coherent presentation and report, providing explanations for positions taken.
  - h. Context and systems, in respect of which a learner is able to demonstrate an understanding of the organisation or operating environment as a system, and application of skills in measuring the environment using key instruments and equipment.
  - i. Management of learning, in respect of which a learner is able to demonstrate the ability to learn within a managed environment.
  - j. Accountability, in respect of which a learner is able to demonstrate the capacity to actively contribute to team effectiveness.


**25. NQF Level Four**

- a. Scope of knowledge, in respect of which a learner is able to demonstrate a fundamental knowledge base of the most important areas of one or more fields or disciplines, in addition to the fundamental areas of study, and a fundamental understanding of the key terms, rules, concepts, established principles and theories in one or more fields or disciplines.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding that knowledge in one field can be applied to related fields.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to apply essential methods, procedures and techniques of the field or discipline to a given familiar context, and the ability to motivate a change using relevant evidence.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to use own knowledge to solve common problems within a familiar context, and the ability to adjust an application of a common solution within relevant parameters to meet the needs of small changes in the problem or operating context with an understanding of the consequences of related actions.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to adhere to organisational ethics and a code of conduct, and the ability to understand societal values and ethics.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate a basic ability in gathering relevant information, analysis and evaluation skills, and the ability to apply and carry out actions by interpreting information from text and operational symbols or representations.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to communicate and present information reliably and accurately in written and in oral or signed form.

- h. Context and systems, in respect of which a learner is able to demonstrate an understanding of the organisation or operating environment as a system within a wider context.
- i. Management of learning, in respect of which a learner is able to demonstrate the capacity to take responsibility for own learning within a supervised environment, and the capacity to evaluate own performance against given criteria.
- j. Accountability, in respect of which a learner is able to demonstrate the capacity to take decisions about and responsibility for actions, and the capacity to take the initiative to address any shortcomings found.

**26. NQF Level Five**

- a. Scope of knowledge, in respect of which a learner is able to demonstrate an informed understanding of the core areas of one or more fields, disciplines or practices, and an informed understanding of the key terms, concepts, facts, general principles, rules and theories of that field, discipline or practice.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate the awareness of how knowledge or a knowledge system develops and evolves within the area of study or operation.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to select and apply standard methods, procedures or techniques within the field, discipline or practice, and to plan and manage an implementation process within a well-defined, familiar and supported environment.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to identify, evaluate and solve defined, routine and new problems within a familiar context, and to apply solutions based on relevant evidence and procedures or other forms of explanation appropriate to the field, discipline or practice, demonstrating an understanding of the consequences.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to take account of, and act in accordance with, prescribed organisational and professional ethical codes of conduct, values and practices and to seek guidance on ethical and professional issues where necessary.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to gather information from a range of sources, including oral, written or symbolic texts, to select information appropriate to the task, and to apply basic processes of analysis, synthesis and evaluation on that information.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to communicate information reliably, accurately and coherently, using conventions appropriate to the context, in written and oral or signed form or in practical demonstration, including an understanding of and respect for conventions around intellectual property, copyright and plagiarism, including the associated legal implications.
- h. Context and systems, in respect of which a learner is able to demonstrate the ability to operate in a range of familiar and new contexts, demonstrating an understanding of different kinds of systems, their constituent parts and the relationships between these parts, and to understand how actions in one area impact on other areas within the same system.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to evaluate his or her performance or the performance of others, and to take appropriate action where necessary; to take responsibility for his or her learning within a structured learning process; and to promote the learning of others.

- 
- j. Accountability, in respect of which a learner is able to demonstrate the ability to account for his or her actions, to work effectively with and respect others, and, in a defined context, to take supervisory responsibility for others and for the responsible use of resources, where appropriate.

#### 27. NQF Level Six

- a. Scope of knowledge, in respect of which a learner is able to demonstrate: detailed knowledge of the main areas of one or more fields, disciplines or practices, including an understanding of and the ability to apply the key terms, concepts, facts, principles, rules and theories of that field, discipline or practice to unfamiliar but relevant contexts; and knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding of different forms of knowledge, schools of thought and forms of explanation within an area of study, operation or practice, and awareness of knowledge production processes.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to evaluate, select and apply appropriate methods, procedures or techniques in investigation or application processes within a defined context.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to identify, analyse and solve problems in unfamiliar contexts, gathering evidence and applying solutions based on evidence and procedures appropriate to the field, discipline or practice.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate an understanding of the ethical implications of decisions and actions within an organisational or professional context, based on an awareness of the complexity of ethical dilemmas.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to evaluate different sources of information, to select information appropriate to the task, and to apply well-developed processes of analysis, synthesis and evaluation to that information.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to present and communicate complex information reliably and coherently using appropriate academic and professional or occupational conventions, formats and technologies for a given context.
- h. Context and systems, in respect of which a learner is able to demonstrate the ability to make decisions and act appropriately in familiar and new contexts, demonstrating an understanding of the relationships between systems, and of how actions, ideas or developments in one system impact on other systems.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to evaluate performance against given criteria, and accurately identify and address his or her task-specific learning needs in a given context, and to provide support to the learning needs of others where appropriate.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to work effectively in a team or group, and to take responsibility for his or her decisions and actions and the decisions and actions of others within well-defined contexts, including the responsibility for the use of resources where appropriate.

## 28. NQF Level Seven

- a. Scope of knowledge, in respect of which a learner is able to demonstrate integrated knowledge of the central areas of one or more fields, disciplines or practices, including an understanding of and the ability to apply and evaluate the key terms, concepts, facts, principles, rules and theories of that field, discipline or practice; and detailed knowledge of an area or areas of specialisation and how that knowledge relates to other fields, disciplines or practices.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate an understanding of knowledge as contested and the ability to evaluate types of knowledge and explanations typical within the area of study or practice.
- c. Method and procedure, in respect of which a learner is able to demonstrate an understanding of a range of methods of enquiry in a field, discipline or practice, and their suitability to specific investigations; and the ability to select and apply a range of methods to resolve problems or introduce change within a practice.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to identify, analyse, evaluate, critically reflect on and address complex problems, applying evidence-based solutions and theory-driven arguments.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to take decisions and act ethically and professionally, and the ability to justify those decisions and actions drawing on appropriate ethical values and approaches within a supported environment.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to develop appropriate processes of information gathering for a given context or use; and the ability to independently validate the sources of information and evaluate and manage the information.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to develop and communicate his or her ideas and opinions in well-formed arguments, using appropriate academic, professional, or occupational discourse.
- h. Context and systems, in respect of which a learner is able to demonstrate the ability to manage processes in unfamiliar and variable contexts, recognising that problem solving is context and system bound, and does not occur in isolation.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to identify, evaluate and address his or her learning needs in a self-directed manner, and to facilitate collaborative learning processes.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to take full responsibility for his or her work, decision-making and use of resources, and limited accountability for the decisions and actions of others in varied or ill-defined contexts.

## 29. NQF Level Eight

- a. Scope of knowledge, in respect of which a learner is able to demonstrate knowledge of and engagement in an area at the forefront of a field, discipline or practice; an understanding of the theories, research methodologies, methods and techniques relevant to the field, discipline or practice; and an understanding of how to apply such knowledge in a particular context.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate the ability to interrogate multiple sources of knowledge in an area of specialisation and to evaluate knowledge and processes of knowledge production.



- c. Method and procedure, in respect of which a learner is able to demonstrate an understanding of the complexities and uncertainties of selecting, applying or transferring appropriate standard procedures, processes or techniques to unfamiliar problems in a specialised field, discipline or practice.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to use a range of specialised skills to identify, analyse and address complex or abstract problems drawing systematically on the body of knowledge and methods appropriate to a field, discipline or practice.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to identify and address ethical issues based on critical reflection on the suitability of different ethical value systems to specific contexts.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to critically review information gathering, synthesis of data, evaluation and management processes in specialised contexts in order to develop creative responses to problems and issues.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to present and communicate academic, professional or occupational ideas and texts effectively to a range of audiences, offering creative insights, rigorous interpretations and solutions to problems and issues appropriate to the context.
- h. Context and systems, in respect of which a learner is able to demonstrate the ability to operate effectively within a system, or manage a system based on an understanding of the roles and relationships between elements within the system.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to apply, in a self-critical manner, learning strategies which effectively address his or her professional and ongoing learning needs and the professional and ongoing learning needs of others.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to take full responsibility for his or her work, decision-making and use of resources, and full accountability for the decisions and actions of others where appropriate.

### 30. NQF Level Nine

- a. Scope of knowledge, in respect of which a learner is able to demonstrate specialist knowledge to enable engagement with and critique of current research or practices, as well as advanced scholarship or research in a particular field, discipline or practice.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate the ability to evaluate current processes of knowledge production, and to choose an appropriate process of enquiry for the area of study or practice.
- c. Method and procedure, in respect of which a learner is able to demonstrate a command of and the ability to design, select and apply appropriate and creative methods, techniques, processes or technologies to complex practical and theoretical problems.
- d. Problem solving, in respect of which a learner is able to demonstrate: the ability to use a wide range of specialised skills in identifying, conceptualising, designing and implementing methods of enquiry to address complex and challenging problems within a field, discipline or practice; and an understanding of the consequences of any solutions or insights generated within a specialised context.




- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to make autonomous ethical decisions which affect knowledge production, or complex organisational or professional issues, and the ability to critically contribute to the development of ethical standards in a specific context.
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to design and implement a strategy for the processing and management of information, in order to conduct a comprehensive review of leading and current research in an area of specialisation to produce significant insights.
- g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to use the resources of academic and professional or occupational discourses to communicate and defend substantial ideas that are the products of research or development in an area of specialisation; and use a range of advanced and specialised skills and discourses appropriate to a field, discipline or practice, to communicate with a range of audiences with different levels of knowledge or expertise.
- h. Context and systems, in respect of which a learner is able to demonstrate the ability to make interventions at an appropriate level within a system, based on an understanding of hierarchical relations within the system, and the ability to address the intended and unintended consequences of interventions.
- i. Management of learning, in respect of which a learner is able to demonstrate the ability to develop his or her own learning strategies, which sustain independent learning and academic or professional development; and can interact effectively within the learning or professional group as a means of enhancing learning.
- j. Accountability, in respect of which a learner is able to demonstrate the ability to operate independently and take full responsibility for his or her own work, and, where appropriate, to account for leading and initiating processes and implementing systems, ensuring good resource management and governance practices.

### 31. NQF Level Ten

- a. Scope of knowledge, in respect of which a learner is able to demonstrate expertise and critical knowledge in an area at the forefront of a field, discipline or practice; and the ability to conceptualise new research initiatives and create new knowledge or practice.
- b. Knowledge literacy, in respect of which a learner is able to demonstrate the ability to contribute to scholarly debates around theories of knowledge and processes of knowledge production in an area of study or practice.
- c. Method and procedure, in respect of which a learner is able to demonstrate the ability to develop new methods, techniques, processes, systems or technologies in original, creative and innovative ways appropriate to specialised and complex contexts.
- d. Problem solving, in respect of which a learner is able to demonstrate the ability to apply specialist knowledge and theory in critically reflexive, creative and novel ways to address complex practical and theoretical problems.
- e. Ethics and professional practice, in respect of which a learner is able to demonstrate the ability to identify, address and manage emerging ethical issues, and to advance processes of ethical decision-making, including monitoring and evaluation of the consequences of these decisions where appropriate.



- 
- f. Accessing, processing and managing information, in respect of which a learner is able to demonstrate the ability to make independent judgements about managing incomplete or inconsistent information or data in an iterative process of analysis and synthesis, for the development of significant original insights into new, complex and abstract ideas, information or issues.
  - g. Producing and communicating information, in respect of which a learner is able to demonstrate the ability to produce substantial, independent, in-depth and publishable work which meets international standards, is considered to be new or innovative by peers, and makes a significant contribution to the discipline, field, or practice; and the ability to develop a communication strategy to disseminate and defend research, strategic and policy initiatives and their implementation to specialist and non-specialist audiences using the full resources of an academic and professional or occupational discourse.
  - h. Context and systems, in respect of which a learner is able to demonstrate an understanding of theoretical underpinnings in the management of complex systems to achieve systemic change; and the ability to independently design, sustain and manage change within a system or systems.
  - i. Management of learning, in respect of which a learner is able to demonstrate the ability to demonstrate intellectual independence, research leadership and management of research and research development in a discipline, field or practice.
  - j. Accountability, in respect of which a learner is able to demonstrate the ability to operate independently and take full responsibility for his or her work, and, where appropriate, lead, oversee and be held ultimately accountable for the overall governance of processes and systems.

### **Review period**

- 32. The level descriptors will be reviewed at least every five years by SAQA, in consultation with the three Quality Councils.

### **Short title**

- 33. This document must be referred to as the Level Descriptors for the National Qualifications Framework.



Telephone: 012 431 5000

Facsimile: 012 431 5147

Helpdesk: 086 010 3188

Website: [www.saqqa.org.za](http://www.saqqa.org.za)

Email: [saqainfo@saqa.org.za](mailto:saqainfo@saqa.org.za)