



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
Total (Level 5):	115	
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
Total (Level 6):	125	
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
Total (Level 7):	115	7
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
Total (Level 8):	125	8
TOTAL	480	

* 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
7.1 Anatomy and Physiology	30	5
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.		
7.2 Psycho-social aspects of physical activity and exercise	15	5
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.		
7.3 Nutrition	15	5
7.3.1 Basic concepts of macro- and micro-nutrition.		
7.3.2 Nutritional demands for different types of exercise.		

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.		
7.4 Biokinetics 1	30	5
Introduction to the profession of Biokinetics		
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.		
7.5 Therapeutic Recreation	15	5
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.		
7.6 Work Integrated Learning 1 (WIL)	15	5
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.		
7.7 Pathology and Pathophysiology	15	6
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.		
7.8 Biomechanics	15	6
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.		

7.9 Perceptual Motor Learning and Control	10	6
<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>		
7.10 Applied Exercise Physiology	30	6
<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 VO_{2max}.</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>		
7.11 Clinical Exercise Testing and Evaluation	30	6
<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.		
7.12 Biokinetics 2		
7.12.1 Wellness, Health Promotion and Disease Prevention	15	6
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</p> <p>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>		
7.13 Work Integrated Learning 2 (WIL)	10	6
<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>		
7.14 Biokinetics 3		
<p>7.14.1 Neuro-musculoskeletal Rehabilitation</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>	15	7
<p>7.14.2 Exercise Management of Chronic Diseases and Disabilities</p> <p>7.14.2.1. The interrelationship between the incidence, aetiology and pathophysiology of various chronic diseases and disabilities.</p>	15	7

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

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.		
7.18 Work Integrated Learning 3 (WIL)	35	7
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.		
7.19 Biokinetics 4		
7.19.1 Wellness, Health Promotion and Disease Prevention 7.19.1.1 Implementation of different wellness initiatives. 7.19.1.2 Complex problem base/case base diseases / conditions and Journal Club.	10	8
7.19.2 Neuro-musculoskeletal rehabilitation 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.	10	8
7.19.3 Exercise Management for Chronic Diseases and Disabilities 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.	10	8
7.20 Practice Management and Ethics	20	8
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>		
7.21 Research Project	30	8
<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>		
7.22 Work Integrated Learning 4 (WIL)	45	8
<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>		

TOTAL	480	
--------------	------------	--

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 document¹ 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**¹.

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.

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
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/>