



Professional Board for Physiotherapy, Podiatry and Biokinetics

Minimum standards for training: BOKINETICS

1. PREFACE

The biokinetics profession 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 biokinetics profession is crucial as part of the multi-disciplinary health team to address this disease burden 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 and athletic trainers, both from the USA. The biokinetics profession 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 addresses both the pathogenic and fortigenic 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 healthcare profession concerned with preventative, therapeutic, rehabilitative, and performance-enhancing exercise modalities to optimise function, movement, and sports performance across the lifespan. Biokineticists undertake comprehensive health, fitness, functional and clinical assessments to design and prescribe safe and effective exercise interventions. Biokineticists implement and supervise scientific individualised physical activity

and exercise programmes for apparently healthy, diseased, and injured individuals throughout the human lifespan. Biokinetics forms part of a holistic and multi-disciplinary approach to deliver evidence-based preventative and rehabilitative healthcare.

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 can perform biokinetics-related healthcare services within any community or health setting. Biokineticists are trained to address the identification and reduction of risk factors for non-communicable diseases and promote 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 healthcare profession as its 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 practise 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 various settings, including the public and private sectors 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 programme 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 programme 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 programme is a four-year full-time professional bachelor's degree obtained in an HPCSA-accredited tertiary institution with students exiting at HEQF (Higher Education Qualification Framework) level 8.

(http://www.saqa.org.za/docs/misc/2012/level_descriptors.pdf).

A graduate is entitled to apply for Postgraduate Diploma, Master's and PhD degree programmes providing he/she meets the specific institutional entry requirements.

4.4 Mode of Delivery

This full-time programme consists of theoretical, practical, and clinical work-integrated learning (WIL) activities. Various learning and teaching methods may be utilised, including face-to-face or classroom-based, blended with online learning methodologies. Problem-based and inquiry-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 PROGRAMME AND GRADUATE ATTRIBUTES

The successful biokinetics graduate must be able to:

- 5.1 Apply foundational knowledge, evaluate information, and interpret and integrate information to prescribe exercise modalities as a prevention and treatment strategy.
- 5.2 Conduct health risk screening for various population groups in various settings and implement appropriate intervention/preventative programmes based on the findings.
- 5.3 Conduct thorough patient assessments and interpret the results.
- 5.4 Respond to the community's health, wellness, and optimal function needs.
- 5.5 Design, implement and monitor therapeutic exercise, recreation, and physical activity intervention programmes, 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 ethically, and responsibly, 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 preparing 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. PROGRAMME REQUISITES/FUNDAMENTALS

This section tabulates the specific outcomes of the minimum training standards required for the training of biokineticists. The programme must be accredited by the Council for Higher Education (CHE) and comply with the following Higher Education Qualifications Sub-Framework (HEQSF) minimum requirements for a professional degree in Health Sciences:

The qualification consists of a minimum of 480 credits (1 credit = 10 notional hours) at an exit level of NQF level 8. The Professional Board for Physiotherapy, Podiatry and Biokinetics (PPB Board) strongly recommends that programmes do not exceed this by more than 5% (maximum 504 credits). Please note that work-integrated learning (WIL) should occur throughout the four years of the programme (refer to the PPB Board guideline for WIL – [Addendum 1](#)).

It remains the prerogative of higher education 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: Recommended NQF levels

Specific outcomes	NQF level
Level 5	
Anatomy and Physiology	5
Psycho-social Aspects of Physical Activity and Exercise	5
Nutrition	5
Biokinetics 1: Introduction to the Profession of Biokinetics	5
Therapeutic Recreation	5
Work Integrated Learning 1 (WIL)	5
Level 6	
Pathology and Pathophysiology	6
Biomechanics	6
Perceptual Motor Learning and Control	6
Applied Exercise Physiology	6
Clinical Exercise Testing and Evaluation	6

Biokinetics 2: Wellness, Health Promotion and Disease Prevention	6
Work Integrated Learning 2 (WIL)	6
Level 7	
Biokinetics 3: Neuro-musculoskeletal Rehabilitation	7
Exercise Management for Chronic Diseases and Disabilities	7
Clinical Exercise Testing and Prescription	7
Research Methodology	7
Pharmacology	7
Work Integrated Learning 3 (WIL)	7
Level 8	7
Biokinetics 4: Wellness, Health Promotion and Disease Prevention	8
Neuro-musculoskeletal Rehabilitation	8
Exercise Management for Chronic Diseases and Disabilities	8
Practice Management and Applied Ethics	8
Research Project	8
Work Integrated Learning 4 (WIL)	8

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

Table 2: Recommended broad outcomes (for the above)

Specific Outcomes	NQF level
1. Anatomy and Physiology	5
1.1 Standard anatomical and physiological terminology in describing the organisation of the human body. 1.2 The cellular basis of physiology, tissue, and body systems. 1.3 Macro and micro-anatomy/physiology of the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, and/or immune system. 1.4 The principles of support and movement integral to the human body. 1.5 Homeostasis and nutrition. 1.6 Reproduction, growth, development, and ageing. 1.7 Basic metabolic processes. 1.8 Basic biochemistry.	
2. Psycho-social Aspects of Physical Activity and Exercise	5
2.1 Foundational theories about psychology and sociology in biokinetics contexts. 2.2 The human psyche and health behaviour, health promotion (wellness), human functioning and performance. 2.3 Motivational interviewing skills within a biokinetics context.	

<p>2.4 Negative psycho-social factors on the individual.</p> <p>2.5 Psycho-social stratification within the South African community.</p> <p>2.6 The different phases of grief following a catastrophic life event.</p> <p>2.7 Coping strategies related to pain and loss.</p> <p>2.8 The long-term effects of distress on health.</p> <p>2.9 Diversity in culture, gender, and income.</p> <p>2.10 Psychological aspect of sports injury and return to play.</p> <p>2.11 Near-death experience/window of opportunity in cardiac rehabilitation.</p>	
3. Nutrition	5
<p>3.1 Basic concepts of macro and micro-nutrition.</p> <p>3.2 Nutritional demands for different types of exercise.</p> <p>3.3 Nutritional demands in patients undergoing neuro-musculoskeletal rehabilitation.</p> <p>3.4 Nutritional demands in patients with chronic disease.</p> <p>3.5 Nutritional needs for special populations such as pregnancy, children, the elderly, and those diagnosed with depression.</p> <p>3.6 Evidence surrounding new trends in nutrition.</p> <p>3.7 Nutrition in sports and exercise recovery and optimal performance.</p>	
4. Biokinetics 1: Introduction to the Profession of Biokinetics	5
<p>4.1 Ancient and modern history of physical activity and health, including landmark research.</p> <p>4.2 Concepts and methods in physical activity epidemiology and disease surveillance.</p> <p>4.3 Origin and history of biokinetics in SA.</p> <p>4.4 Professional conduct and ethics.</p> <p>4.5 Legal aspects.</p> <p>4.6 Working in a multi-disciplinary team.</p> <p>4.7 Scope of practice.</p> <p>4.8 Introduction to total wellness.</p> <p>4.9 Introduction to chronic diseases and conditions.</p> <p>4.10 Introduction to muscular-skeletal health: Injury prevention, identification and common conditions</p> <p>4.11 Introduction to measurement and evaluation.</p> <p>4.12 Introduction to exercise prescription.</p>	
5. Therapeutic Recreation	5
<p>5.1 Historical development of therapeutic recreation.</p> <p>5.2 Evidence-based models and approaches to practice.</p> <p>5.3 Assessment and documentation in therapeutic recreation.</p> <p>5.4 Development of therapeutic intervention programmes for apparently healthy and special populations.</p> <p>5.5 Leisure education and elimination of barriers to participation.</p> <p>5.6 Adherence to interventions, specifically to therapeutic exercise from a behavioural change perspective.</p> <p>5.7 Group dynamics versus individual rehabilitation.</p>	
6. Work Integrated Learning 1 (WIL)	5
6.1 Complete 100 hours of WIL.	

<p>6.2 Experience in the clinical field of biokinetics through observation, participation, and workplace-based learning.</p> <p>6.3 Portfolio of evidence documenting clinical experiences and case studies.</p> <p>6.4 Practical physical fitness and health assessments; prescription and monitoring of individual and group exercise programmes (including therapeutic recreation) in apparently healthy or low-risk individuals.</p> <p>6.5 Critical reflection on own experiences.</p> <p>6.6. Practice management skills and competencies.</p> <p>6.7 Ethical behaviour and adherence to the biokineticists scope of practice.</p> <p>6.8 Legal compliance within the profession of biokinetics.</p> <p>6.9 Practical application of theoretical knowledge, values, and behaviours in the field of biokinetics.</p> <p>6.10 BLS level 1 certification inclusive of CPR and AED protocols.</p>	
7.7 Pathology and Pathophysiology	6
<p>7.7.1 The epidemiology of common diseases.</p> <p>7.7.2 The terminology used within pathophysiology.</p> <p>7.7.3 Pathogens and disease.</p> <p>7.7.4 The immune system.</p> <p>7.7.5 Wound healing and pain.</p> <p>7.7.6 Acute and chronic inflammation.</p> <p>7.7.7 The risk factors, causes, pathophysiology, symptoms, management, and treatment for: neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, and/or immune conditions/diseases.</p> <p>7.7.8 The possible role of exercise in treating or managing these conditions.</p> <p>7.7.9 Common medications used to treat these diseases or conditions.</p>	
7.8 Biomechanics	6
<p>7.8.1 Biomechanics terminology.</p> <p>7.8.2 Dynamic, muscle function, movement biomechanics, integrative functioning of the neuromuscular and musculoskeletal systems in exercise and physical activity programmes.</p> <p>7.8.3 The different planes of movement and the different axis used to describe human movement.</p> <p>7.8.4 Musculoskeletal biomechanics and pathomechanics.</p> <p>7.8.5 Newtonian principles when analysing human movement.</p> <p>7.8.6 Calculations related to force, work, power, and energy.</p> <p>7.8.7 The different types of forces that may act on the human body, including torque and lever and pulley systems.</p> <p>7.8.8 The principles related to movement through the air and water mediums.</p> <p>7.8.9 Different methods to perform vector analysis.</p> <p>7.8.10 The factors that determine balance and stability (global and local stabilisers).</p> <p>7.8.11 Kinematic and kinetic analyses on linear and angular movements for the development of corrective interventions.</p> <p>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.</p> <p>7.8.13 Anatomical analyses of isolated and integrated movements, common exercises, and simple sporting manoeuvres.</p>	

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	6
7.9.1 Human growth, development, maturation and ageing to a variety of biokinetics contexts.	
7.9.2 The different factors that can influence the perceptual-motor development of human skills.	
7.9.3 Gross and fine motor development.	
7.9.4 The structure and function of the central nervous system as it relates to human functioning in biokinetics context.	
7.9.5 Neuromuscular control for rehabilitation and body posture.	
7.9.6 Fundamental motor development and perceptual-motor development theories and concepts to a variety of contexts.	
7.9.7 Motor development and perceptual-motor development evaluation and interventions.	
7.9.8 Normal and abnormal human movement patterns in relation to neuromuscular functioning (e.g., gait).	
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.	
7.10 Applied Exercise Physiology	6
7.10.1 The human body's acute responses and chronic adaptation to physical activity, exercise, and training in the neuro-musculoskeletal, neurological, cardiovascular, pulmonary, metabolic, endocrine, and auto-immune systems.	
7.10.2 The bioenergetics related to different modes of exercise.	
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.	
7.10.4 The differences in exercise responses and adaptations according to gender and age.	
7.10.5 Applied biochemistry in exercise and training.	
7.10.6 Exercise testing and interpretation of:	
7.10.6.1 Body composition, e.g., body fat percentage	
7.10.6.2 Musculoskeletal system, e.g., flexibility, proprioception, strength (isometric, isotonic and isokinetic), speed, power, and muscle endurance.	
7.10.6.3 Cardio-respiratory system, e.g., blood pressure, lung function, and VO_{2max} .	
7.10.6.4 Anaerobic capacity.	
7.10.6.5 Biochemical aspects, e.g., blood glucose, cholesterol, and lactate threshold.	
7.10.6.6 Resting and exercise ECG.	
7.10.6.7 Muscle activity and biofeedback with EMG.	
7.10.6.8 Nutritional and hydration status.	

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

<p>7.12.12 Theoretical strategies and approaches to increase exercise adoption and adherence:</p> <p>7.12.12.1. Brief Counselling and Motivational Interviewing</p> <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 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 programmes for different individuals and groups in therapeutic and recreational contexts, and programmes for different groups/populations.</p> <p>7.12.16 Physical activity and regular exercise in promoting health and the utilisation of recreation programmes to promote health.</p>	
<p>7.13 Work Integrated Learning 2 (WIL)</p>	<p>6</p>
<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 programmes 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 biokineticists 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>	
<p>7.14 Biokinetics 3</p>	<p>14</p>
<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 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 programmes.</p> <p>7.14.1.8. Apply evidence-based criteria for successful discharge of a rehabilitated patient within the criteria.</p>	<p>7</p> <p>7</p>

<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> <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 programmes for various chronic diseases and disabilities.</p> <p>7.14.2.7. Report writing, patient education and or referral.</p>	
<p>7.15 Clinical Exercise and Prescription</p>	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, 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 programmes 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>	
<p>7.16 Research Methodology</p>	7
<p>7.16.1 Research methods and concepts used in research, a variety of approaches and techniques of research methods, data collection, and 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>	
<p>7.17 Pharmacology</p>	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>	

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.	
7.18 Work Integrated Learning 3 (WIL)	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 programmes 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 biokineticists 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	8
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.	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.	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.	8
7.20 Practice Management and Ethics	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 models as used in other countries to contexts in South Africa. 7.20.4 Marketing of a biokinetics practice. 7.20.5 Health policy, health systems and structures, capacity building and	

<p>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 programmes, individuals, teams, and subordinates within the value system of the profession.</p> <p>7.20.13 Entrepreneurial skills in establishing and managing a biokinetics practice and skill required for entrepreneurship.</p> <p>7.20.14 Basic management functions and competencies in private and public biokinetic practice/healthcare facility contexts.</p>	
7.21 Research Project	8
<p>7.21.1 Identify a biokinetics related problem, derive a relevant research question based on current literature, and draft a research 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 ethically and responsibly.</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)	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 programmes 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 biokineticists 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>	

8. QUALITY ASSURANCE

- 8.1 Quality assurance measures should be aligned with the institutional policy, and the programme must be **accredited** by the PPB Board of the HPCSA (Health Professions Council of South Africa), 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) should have a master's degree and/or at least three years of clinical experience; and
- 8.2.2 Demonstrate CPD (Continuing Professional Development) 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, learning activities, tests and/or examination processes and promotion criteria are clearly indicated, must be available to all students before any module/course starts.
- 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 Programme 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)

8.5.6 Students must work under **supervision** by a registered biokineticist. Refer to the guidelines for placements without a qualified biokineticist ([Addendum 2](#)):

8.6 Assessment:

8.6.1 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.

8.6.2 External moderation

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

8.6.2.2 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).

8.7 Facilities:

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

Addendum 1

PPB Board guidelines for Work Integrated Learning (WIL) in Professional BACHELOR'S degree 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 economic or narrow workplace interests should not dictate a WIL curriculum. 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 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 include **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 graduateness, 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 pp: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 or peers in laboratories or virtual or simulated environments, or workplace 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 number of hours to be spent on skills acquisition/training. However, there is a common understanding 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 or clients in real-world or workplace settings. The minimum requirements for workplace-based learning (WPBL), however are specified by the PPB board's minimum standards of training. It is recommended that exposure to the real world (authentic work settings) occurs from year 1.

For a 4-year professional programme the WIL hours are spread over four years as specified in the minimum standards of training.

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.

Outcomes:

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

The clinical or workplace setting should:

- ensure that students have adequate exposure to a range of clinical conditions representative of the profession.
- ensure that students have equivalent exposure (*it is recognized that not all students can work in all the same settings*)
- allow for development of well-rounded healthcare professional (includes the development of graduate attributes and/or critical competencies (e.g., communicator, scholar, professional, collaborator, leader, health advocate and manager)

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)
- Portfolio⁶⁻⁸ – 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. Dean, B., Yanamandram, V., Eady, M. J., Moroney, T., O'Donnell, N., & Glover-Chambers, T. (2020). An Institutional Framework for Scaffolding Work-Integrated Learning Across a Degree. *Journal of University Teaching & Learning Practice*, 17(4). <https://doi.org/10.53761/1.17.4.6>

3. Jackson, D. (2017). Developing pre-professional identity in undergraduates through work-integrated learning. *High Educ* **74**, 833–853 <https://doi.org/10.1007/s10734-016-0080-2>
4. 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/>
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6. Rowland, P., Anderson, M., Kumagai, A.K. *et al.* (2019). Patient involvement in health professionals' education: a meta-narrative review. *Adv in Health Sci Educ* **24**, 595–617 <https://doi.org/10.1007/s10459-018-9857-7>
7. 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
DOI: [10.1080/01421590902889897](https://doi.org/10.1080/01421590902889897)
8. Jillian L. Clarke & David Boud (2018) Refocusing portfolio assessment: Curating for feedback and portrayal, *Innovations in Education and Teaching International*, 55:4, 479-486, DOI: [10.1080/14703297.2016.1250664](https://doi.org/10.1080/14703297.2016.1250664)
9. Uygur J, Stuart E, De Paor M, Wallace M, Duffy S, *et al.* (2019). A Best Evidence in Medical Education systematic review to determine the most effective teaching methods that develop reflection in medical students: BEME Guide No. 51, *Medical Teacher*, 41:1, 3-16
DOI: [10.1080/0142159X.2018.1505037](https://doi.org/10.1080/0142159X.2018.1505037)

Addendum 2

Guidelines for clinical supervision

Definitions:

“**Clinical Supervision**” means “An exchange between practicing professionals to enable the development of professional skills” (CSP (Chartered Society of Physiotherapy)).

“**Students**” means the undergraduates and postgraduates registered with a university and enrolled in a program registerable with the PPB.

“**Clinical placements**” means the physical venues where patient engagement occurs.

Examples may include hospitals, clinics, schools, and domiciliary visits and sporting venues/events etc.

Students:

- Students may only work under the supervision of registered professionals from the same profession (e.g., only registered Biokineticists can supervise student Biokineticists).
 - This supervision may be “in-person” or performed remotely if it is in the best interests of both parties.
 - Where there is no “own profession” registered clinical supervisor on-site, a nominated clinical supervisor must be made available by the University.
- Students not fulfilling their supervisory obligations may incur disciplinary action.
- Should students require a leave of absence for illness or for any other reason, especially for an extended period, then the period of supervised training may have to be extended to comply with the institutional and/or professional regulatory requirements.
- Should a student become mentally or physically incompetent to perform professionally, then the matter should be reported to the Health Committee of Council to investigate the circumstances and provide guidance on the student or deal with the matter as circumstances dictate.

Clinical supervisors / clinical educators:

- Clinical supervision should support and enhance the appropriate professional practice for the benefit of patients and students.
 - It involves an experienced physiotherapist guiding the practice of a less experienced (student) physiotherapist, and aims to bridge the gap in professional experience,

ensuring that patient care is not negatively affected by a therapist's inexperience (Snowdon *et al.* 2020).

- Clinical supervisors should disclose to students from the outset what is expected of them during the supervision period, clarify roles and responsibilities, rules and regulations and how the supervision process will be managed from start to finish.
- Clinical supervisors should help ensure that students under supervision are compliant with the regulatory requirements of their profession.
- Clinical supervisors should ensure that students are compliant with the institutional requirements, especially regarding professional practice, safety and conduct.
- Clinical supervisors should engage in regular feedback with students to grow in the profession.
- Clinical supervisors should assist students in developing reflective practice skills and to critically evaluate their own practice.
- The clinical supervisor should guide the student to identify appropriate opportunities to develop professional independence.
- Clinical supervision should be distinct from formal line management supervision and appraisal which may differ between different clinical sites.
- Clinical supervision must be planned, systematic and conducted within agreed boundaries.
 - The clinical supervisor needs to be available at times convenient to the students.
- Supervisors must allow for clear and unambiguous communication, conducted in an atmosphere of mutual respect.
 - This may include either face-to-face interactions or remote interactions.
 - “Remote” interactions include being available by cell phone (voice or video call) or by other online platforms that are approved by the university).
- Supervisors should be evaluated against standards set by the university department with whom the students are training.
- Supervisors should demonstrate ongoing professional development in clinical training and assessment.
- Supervisors must be of good professional standing and conduct and uphold the integrity of the profession and institution they serve.

The Clinical Supervision process should:

- Be appropriately resourced by the University department.
 - This relates to time (Scheduling and Quantum), the explicit training of clinical staff, and the provision of appropriate and safe transport.
- Support a local system for supervisors to further develop their skills in clinical facilitation.
- Clinical supervisors must ensure that students are exposed to the full scope of their profession at authentic clinical sites and meet the minimum standards of training upon termination of the supervision period.
- The supervisor-to-student ratio for clinical supervision should be appropriate to enhance the learning of the student and not compromise the supervision process.
- Initially, the supervision provided by the supervisor should be face-to-face, preferably, and fully conducted by the supervisor. Gradually, as the student increases in knowledge, skill, competency and confidence, then more responsibility can be relinquished to the student to grow as a practitioner.
- Students should be evaluated both formally and informally on a regular basis throughout the period of their supervision in order to ensure that they progress at the expected rate and are found competent by the end of the supervision period.
- For students experiencing difficulty in keeping up with the supervision targets, then some corrective measures and remedial action should be put in place to support such students.
- In the event of unsatisfactory performance by a student during the supervision process, a written report should be produced by the supervisor documenting the due process that was followed to support the student with recommendations as to the way forward for the student.
- During the supervision process, the student should be encouraged to maintain a portfolio of evidence of clinical practice to help encourage reflective clinical practice.

References

1. CSP <https://www.csp.org.uk/publications/clinical-supervision-brief-overview>
2. Snowdon, DA. Cooke, S. Lawler, K. Scroggie, Williams, GK, Taylor. 2020. Physiotherapists Prefer Clinical Supervision to Focus on Professional Skill Development: A Qualitative Study. *Physiotherapy Canada* 72(3); 249–257; doi:10.3138/ptc-2019-0004
3. HCPC templates <https://www.hcpc-uk.org/standards/meeting-our-standards/supervision-leadership-and-culture/supervision/supervision-case-studies-and-templates/supervision-templates/>