ESSA
EXERCISE & SPORTS SCIENCE AUSTRALIA

# ACCREDITED **EXERCISE SCIENTIST PROFESSIONAL STANDARDS** 2020

*Board approved: June 2020*

# Contents

# Preface

The Exercise & Sports Science Australia (ESSA) Accredited Exercise Scientist (AES) Professional Standards set the minimum standards for a professional to be accredited as an Exercise Scientist. The standards broadly describe the minimum practice requirements of graduates working in all areas of exercise science and inform a curriculum framework for education in exercise, sport and movement sciences.

The standards also underpin the Exercise Physiology and Sports Science accreditations with ESSA.

This document is a revision of the 2013 Exercise Science Standards and have been developed in consultation with the ESSA membership and academic and industry professionals.

The Accredited Exercise Scientist Professional Standards are presented as fourteen standards covering the core sub-discipline areas of the exercise science field. Each individual standard includes a guiding principle that outlines intent, with elements of performance of professional outcomes. The core values and expectations of an Accredited Exercise Scientist are described in the Professional Attributes, which bring together the individual standard areas in a context that applies across all aspects of Exercise Science practice.

ESSA and the ESSA Standards Council would like to sincerely thank the members of the ESSA Accredited Exercise Science Review Committee, who have made a direct and valuable contribution to the 2019 revision of the ESSA Accredited Exercise Scientist Professional Standards.

***Members of the ESSA Accredited Exercise Science Review Committee***

- Associate Professor Tim Doyle (Chair)
- Ms Merilyn Lock (Deputy Chair)
- Mr Barry Pritchard (Research Governance & Integrity Advisor – ESSA)
- Dr Elizabeth (Liz) Bradshaw
- Ms Eliza Cooper
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- Dr Matthew Jones
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# Important Terminology and Concepts

Accredited Exercise Scientists are professionals equipped with the knowledge and skills to apply the science of exercise when developing interventions that improve health and fitness, well-being and performance, and that assist in the prevention of injury and chronic conditions.

The aim of an Accredited Exercise Scientist's intervention is to educate, promote and implement and manage the adoption and maintenance of physical activity and/or exercise-related health behaviours.

Accredited Exercise Scientists teach, coach and motivate clients to facilitate self-management of physical activity, exercise and healthy lifestyles; using models of behaviour change, scientific evidence and critical thinking, whilst accounting for individual factors and social determinants of health. An Accredited Exercise Scientist practices in a culturally safe and inclusive manner and according to the principles of client-centred care.

AES is the accepted acronym for Accredited Exercise Scientist.

***Settings***

Accredited Exercise Scientists apply their skills to improve health and fitness, well-being and performance in a broad range of contexts. Key areas of practice include, but are not limited to, occupational/corporate health, primary prevention, education, sport and recreation, fitness and exercise training, and physical activity within population/community health settings. Accredited Exercise Scientists can also play a significant role in preventative health, including emerging areas such as healthy ageing, mental health, disability and managing risk factors for chronic conditions including, but not limited to, obesity and pre-diabetes. An Accredited Exercise Scientist has the capability to deliver services in person or via telepractice.

***Diversity and Inclusive Practice***

The Accredited Exercise Scientist Professional Standards apply to an array of populations in Australia including, but not limited to, Aboriginal and Torres Strait Islander peoples, people with diverse genders, bodies, relationships and sexualities, persons of culturally and linguistically diverse backgrounds, and persons living with a disability.

Given the level of diversity within Australian communities, Accredited Exercise Scientists will have an awareness of diversity that enables them to shape and deliver their services in a respectful, inclusive and culturally safe manner.

Considerations include:

- beliefs about and attitudes towards health care;
- attitudes towards pushing the boundaries of performance;
- ensuring a safe, non-judgemental environment that is sensitive to client's individual preferences regarding the Accredited Exercise Scientist they engage;
- awareness of relevant Child Protection Legislation when working with persons 17 years old or younger;
- differences surrounding modesty and exposing skin;
- cultural and/or religious practices and customs that may affect services; and
- communication needs and barriers.

***Social Determinants of Health***

For the purposes of these standards, the term social determinants of health has been used to reflect factors that include the broad range of ecological, individual, social, cultural and economic factors that influence health and well-being.

***Evidence-based***

Evidence-based practice refers to the application of the best available evidence supporting professional practice. High quality, peer-reviewed published research is preferred, where available. Where an evidence base is not strong enough, following evidence-informed practice that utilises consensus-based best practice and the application of sound professional reasoning is expected.

***Integration of Knowledge and Skills***

These professional standards focus on application of knowledge and skills and are based on a strong foundational knowledge of the core sub-disciplines of exercise. It is also expected that the knowledge and skills defined throughout the elements of the Exercise Science standards will be integrated and applied across the core sub-disciplines of Exercise Science.

# Professional Attributes

**An Accredited Exercise Scientist can:**

1. Integrate knowledge and skills from the core sub-disciplines of exercise science to deliver a broad range of services.
2. Critically analyse and apply decision-making and problem-solving skills across exercise science practice.
3. Design, deliver and manage physical activity and exercise-based interventions including assessments and programming for the purpose of improving health and fitness, well-being or performance.
4. Deliver exercise-based interventions for clients with medical conditions, injuries or disabilities that have been prescribed by a health professional qualified in clinical exercise prescription.
5. Apply behavioural change principles to support adherence to physical activity and exercise-based interventions.
6. Use a range of modalities to communicate effectively with clients and relevant stakeholders including families, carers and other health and exercise professionals, and maintain appropriate documentation and records of services.
7. Practice ethically, collaboratively and innovatively within the scope of exercise science training including referrals to relevant medical and health professionals and/or services as appropriate.
8. Display professional conduct, decision making, communication, and client-centred care that is consistent with the ESSA Code of Professional Conduct and Ethical Practice.
9. Apply evidence-based practice and compile, critically evaluate and communicate the scientific rationale for professional decision making and service delivery, including evaluation of outcomes.
10. Commit to professional self-development in the field of exercise science through educational engagement and ongoing learning, self-evaluation of practice, inter- professional working relationships, innovative practice, and support of new graduates.
11. Practice in a safe, respectful and inclusive way that is responsive to the diverse needs of people, including Aboriginal and Torres Strait Islander peoples, gender and sexually diverse persons, persons of culturally and linguistically diverse backgrounds, and persons living with a disability.
12. Critically analyse technology and apply appropriate digital practices.
13. Demonstrate professional leadership and advocate for client access to services and the exercise science profession.

# 1. Professional Practice

### 1.1. Guiding principle

An Accredited Exercise Scientist can apply their exercise science knowledge and skills to practice effectively in an ethical, professional and responsible manner.

### 1.2. Elements of Professional Practice

An Accredited Exercise Scientist has demonstrated an ability to:

1.2.1. Apply knowledge and skills in a variety of professional exercise science work settings.

1.2.2. Support clients to meet their goals through the integration and application of the exercise science sub-discipline standards.

1.2.3. Choose and apply a variety of verbal and non-verbal communication methods appropriate to the client and/or population, carers and other health and exercise professionals.

1.2.4. Practice with integrity within the scope of training for an Exercise Scientist and the ESSA Code of Professional Conduct and Ethical Practice.

1.2.5. Distinguish roles of exercise professionals and health professionals within exercise science settings and judge when to refer.

1.2.6. Identify risks and apply appropriate risk management strategies to the professional practice of exercise science.

1.2.7. Practice in accordance with ethically relevant policies, legislation and regulations that apply to exercise science settings including privacy, consent and record keeping.

1.2.8. Describe the broad structure of the Australian health system and the roles of Exercise Scientists.

# 2. Biomechanics

## 2.1. Guiding principle

An Accredited Exercise Scientist can apply anatomical and mechanical principles to analyse and evaluate human movement.

## 2.2. Elements of Biomechanics

An Accredited Exercise Scientist has demonstrated an ability to:

2.2.1. Describe biomechanical principles and how they relate specifically to the analysis of various forms of human movement to demonstrate an understanding of:

2.2.1.1. Movement analysis knowledge and skills.

2.2.1.2. Scientific approaches to ascertaining the aetiology of injury and acute, chronic and complex conditions as they relate to movement.

2.2.1.3. The physical effects of human interaction with equipment and the environment.

2.2.2. Apply the principles of the biomechanical analysis of human movement to activities of daily living across a broad range of populations.

2.2.3. Analyse biomechanical problems and develop and implement relevant intervention strategies to the movement context.

2.2.4. Choose and interpret biomechanical measurements relevant to client's needs.

2.2.5. Choose and apply appropriate communication to explain scientific data and movement techniques to clients and other professionals.

2.2.6. Identify specific aspects of movement patterns important for performance improvement and injury prevention.

# 3. Exercise Physiology

### 3.1. Guiding principle

An Accredited Exercise Scientist can apply knowledge of the effects of acute and chronic exercise on the physiological systems to evaluate, improve and maintain the health and fitness, well-being and performance of an individual.

### 3.2. Elements of Exercise Physiology

An Accredited Exercise Scientist has demonstrated an ability to:

3.2.1. Describe the function, regulation and interaction of physiological systems relating to exercise.

3.2.2. Describe the individual and integrated physiological responses and adaptations to acute and chronic exercise under normal conditions, in different environments, and by external influences (e.g. ergogenic aids or technologies).

3.2.3. Design exercise-based interventions to maintain and/or improve health and fitness, well-being and performance that consider the physiological responses to acute exercise, and the adaptations to chronic exercise.

3.2.4. Analyse and interpret physiological data obtained during acute exercise, and compare such data between time points, individuals and populations.

# 4. Exercise Prescription and Delivery

## 4.1. Guiding principle

An Accredited Exercise Scientist can design, deliver and modify safe, appropriate and effective exercise-based interventions for the purposes of improving health and fitness, well-being or performance in individual and group settings. An Accredited Exercise Scientist can also deliver exercise-based interventions for clients with medical conditions, injuries or disabilities that have been prescribed by a health professional qualified in clinical exercise prescription.

## 4.2. Elements of Exercise Prescription and Delivery

An Accredited Exercise Scientist has demonstrated an ability to:

4.2.1. Select and apply a range of evidence-based tools and methods to prescribe monitor and evaluate exercise load and progress based on the needs of individuals.

4.2.2. Interpret data obtained during a client assessment to prescribe, deliver and monitor physical activity and exercise-based interventions.

4.2.3. Analyse a broad range of exercise modalities and select appropriate exercises and equipment to suit the needs and abilities of clients including consideration of social determinants of health.

4.2.4. Apply the principles of motor control and learning, functional anatomy and biomechanics to assess movement and to recognise dysfunctional movement patterns and unsafe exercise technique.

4.2.5. Select and apply learning cues and movement progressions for teaching and correcting movement and exercise technique.

4.2.6. Identify and explain the common contraindications for participation in exercise and the associated risks.

4.2.7. Identify, interpret, report and take appropriate action regarding adverse signs and symptoms that may arise during exercise, sport and recovery.

4.2.8. Evaluate and monitor exercise-based interventions to ensure client safety.

4.2.9. Evaluate and record client progress during an exercise-based intervention and communicate with the client, and families, carers and other health and exercise professionals where appropriate.

4.2.10. Design and deliver evidence-based, exercise-based interventions and apply behavioural strategies that meet the needs and preferences of clients.

4.2.11. Select and apply appropriate technology to support in-person and telepractice service delivery.

4.2.12. Deliver an exercise-based intervention for clients with medical conditions, injuries or disabilities that have been prescribed by a health professional qualified in clinical exercise prescription.

# 5. Functional Anatomy

## 5.1. Guiding principle

An Accredited Exercise Scientist can demonstrate an understanding of the neuro-musculoskeletal system and its relevance to function and movement.

## 5.2. Elements of Functional Anatomy

An Accredited Exercise Scientist has demonstrated an ability to:

5.2.1. Explain individual joint complexes and their independent and composite functions in posture and movement analysis in exercise.

5.2.2. Explain the relationship of structure (including micro and macro) with function, force and movement.

5.2.3. Identify the components of the neuro-musculoskeletal system of the body, and describe the role of the bony segments, joint-related connective tissue structures, muscles and forces applied to these structures.

5.2.4. Describe the impact of body proportions on body composition and function.

5.2.5. Describe the adaptations that can occur within the neuro-musculoskeletal system as a result of deconditioning, ageing and injury, and the role of physical activity and exercise for preventing functional decline.

5.2.6. Analyse and evaluate results from static and dynamic assessments and provide recommendations for exercise prescription.

5.2.7. Analyse movement identifying which muscles are active in producing and controlling a movement of a joint.

# 6. Growth and Development

## 6.1. Guiding principle

An Accredited Exercise Scientist can apply knowledge of how physiological factors and social determinants of health influence exercise capacity, and how physical activity can influence changes in the human body, from conception to older age.

## 6.2. Elements of Growth and Development

An Accredited Exercise Scientist has demonstrated an ability to:

6.2.1. Describe the stages of growth, maturation and development across the lifespan, from conception through to reproduction and death.

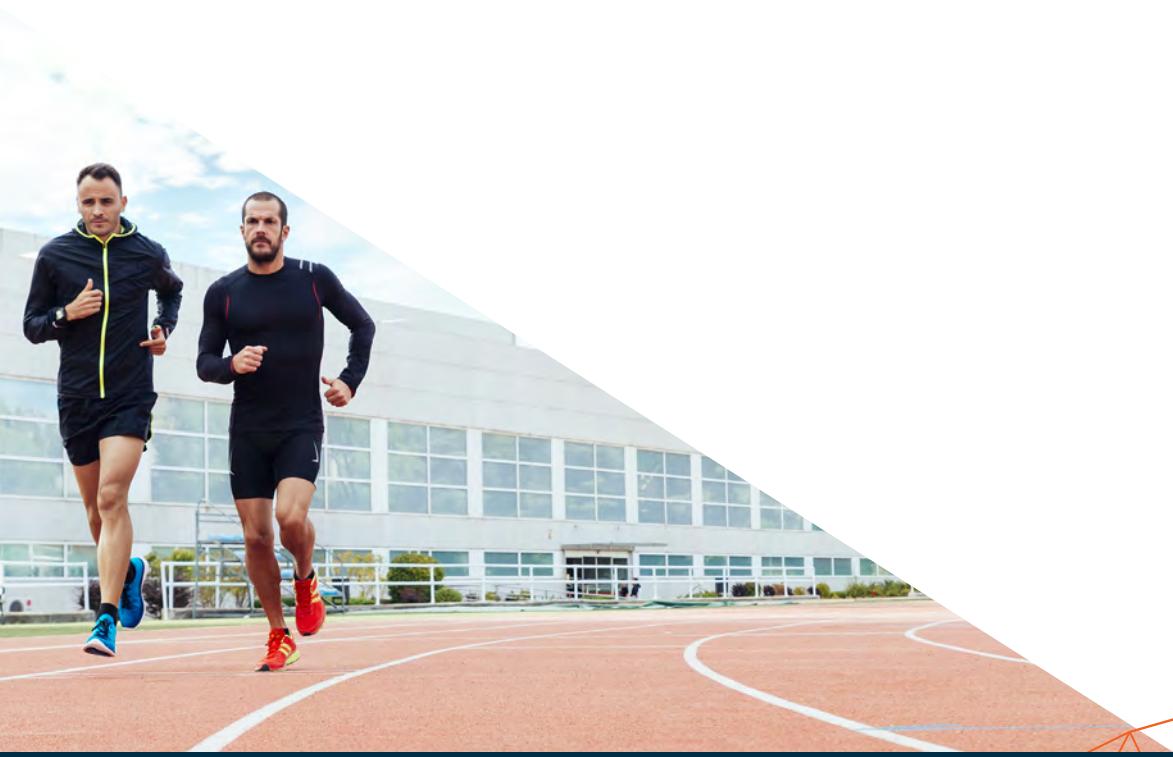
6.2.2. Describe the difference between chronological and biological age, and the implications of these two factors across the life span.

6.2.3. Identify exercises that are contraindicated for particular stages of growth, maturation and development across the lifespan, and have knowledge of the injuries or conditions that commonly present during certain stages of growth and development.

6.2.4. Describe the structural, physiological, motor and psychosocial developmental changes across the lifespan, and the effect, and timing of, physical activity and exercise to elicit change.

6.2.5. Apply evidence-based physical activity and exercise principles affecting growth, development, pregnancy, and ageing.

6.2.6. Illustrate the social determinants of health that affect growth and development.



# 7. Health and Exercise Assessment

## 7.1. Guiding principle

An Accredited Exercise Scientist can safely conduct a health, physical activity and exercise evaluation considering client needs and goals, perform common exercise assessments, interpret the results, and communicate the findings.

## 7.2. Elements of Health and Exercise Assessment

An Accredited Exercise Scientist has demonstrated an ability to:

7.2.1. Select and apply appropriate assessment procedures, including screening of appropriate social determinants of health, goal setting, obtaining informed consent and a relevant medical history, and performing a pre-exercise risk assessment and understand when onward referrals are warranted.

7.2.2. Identify and use the common processes and equipment required to conduct accurate and safe health, physical activity and exercise assessments.

7.2.3. Identify and describe the limitations, contraindications or considerations that may require the modification of assessments and make appropriate adjustments for diverse individuals.

7.2.4. Explain the scientific rationale, reliability, validity, assumptions and limitations of common assessments.

7.2.5. Describe the principles and rationale for the calibration of equipment in commonly used in assessments and recognise and recalibrate equipment when required.

7.2.6. Select, develop and conduct appropriate protocols for safe, effective and culturally sensitive assessments including risk management and risk assessment concepts associated with the health and assessment of exercise science.

7.2.7. Identify the need for guidance or further information from an appropriate health professional and recognise when medical supervision is required before or during an assessment and when to cease a test.

7.2.8. Analyse, interpret, communicate and record information and results from assessments including the accuracy and limitations of the assessment with the client, and families, carers and other health and exercise professionals where appropriate.

# 8. Human Anatomy

## 8.1. Guiding principle

An Accredited Exercise Scientist can demonstrate knowledge of human anatomy relevant to exercise science.

## 8.2. Elements of Human Anatomy

An Accredited Exercise Scientist has demonstrated an ability to:

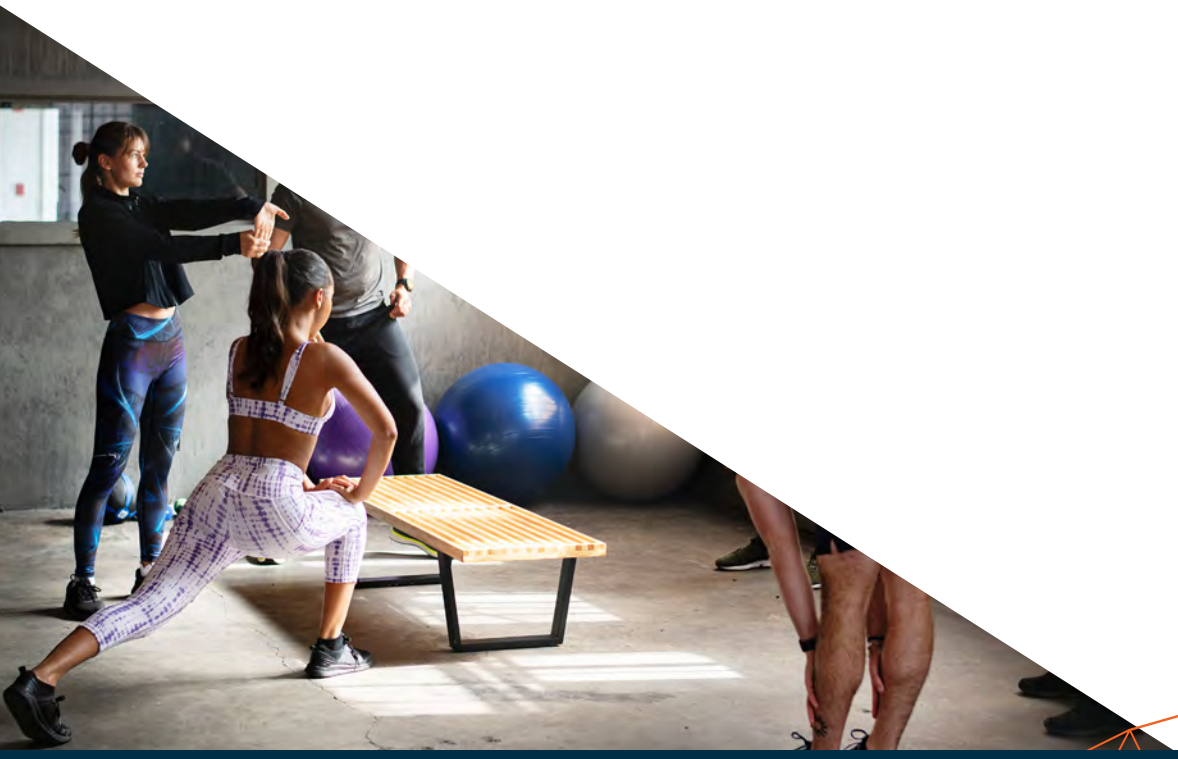
8.2.1. Identify anatomical structures as they relate to all body systems.

8.2.2. Describe the structural and operational processes of anatomical structures and their interrelationships.

8.2.3. Apply anatomical terms to describe position, movement, body direction, regions, body planes or sections.

8.2.4. Identify musculoskeletal structures from surface anatomy.

8.2.5. Utilise relevant anatomical or lay terms in communication with clients, and families, carers and other health or exercise professionals where appropriate.



# 9. Human Physiology

## 9.1. Guiding principle

An Accredited Exercise Scientist can demonstrate knowledge of human anatomy relevant to exercise science.

## 9.2. Elements of Human Physiology

An Accredited Exercise Scientist has demonstrated an ability to:

9.2.1. Describe the function and relationship of physiological systems.

9.2.2. Describe the physiological functions of the broad range of human cells in signal transduction, regulation of gene expression, transport, excitability, transmission and homeostasis.

9.2.3. Describe the interaction effects of different physiological systems.

# 10. Motor Learning and Control

### 10.1. Guiding principle

An Accredited Exercise Scientist can interpret the theoretical basis of motor control and learning to select and perform appropriate assessments of human motor skills. An Accredited Exercise Scientist can design a suitable evidence-based program for teaching motor skills to meet the unique needs of different individuals and populations.

### 10.2. Elements of Motor Learning and Control

An Accredited Exercise Scientist has demonstrated an ability to:

10.2.1. Describe the structure and function of the neuromuscular and sensory systems as they relate to the control of voluntary and involuntary movement and motor learning.

10.2.2. Explain the changes in motor function that may occur with motor learning and development across the lifespan.

10.2.3. Identify the strengths and limitations of techniques to assess processes of motor learning and motor control.

10.2.4. Discuss the common theoretical models proposed to explain motor control and the processes of motor learning.

10.2.5. Assess aspects of an individual's motor function in physical activity and exercise contexts including applying risk management and risk assessment concepts associated with the motor learning and control of exercise science.

10.2.6. Design motor learning environments and protocols to maximise each individual's specific motor learning and control outcomes, as appropriate in physical activity and exercise contexts.

# 11. Nutrition

### 11.1. Guiding principle

An Accredited Exercise Scientist can apply foundational knowledge and skills to provide general advice on nutrition to support general health, well-being, fitness and performance.

### 11.2. Elements of Nutrition

An Accredited Exercise Scientist has demonstrated an ability to:

11.2.1. Describe the basic functions of macronutrients and micronutrients, their common sources, and their role in energy balance and health.

11.2.2. Identify the strengths and limitations of commonly used methods for measuring and analysing dietary intake and body composition.

11.2.3. Recognise signs of inappropriate dietary behaviours and energy availability in relation to physical activity and exercise requirements and refer onwards as appropriate.

11.2.4. Describe the role of diet in the aetiology of chronic conditions and obesity and explain the metabolic and chronic health consequences of obesity.

11.2.5. Describe the evidence for the efficacy of common nutritional supplements and ergogenic aids and demonstrate awareness of prescribed or illegal supplements.

11.2.6. Describe a basic dietary analysis and discuss its implications for general health and well-being.

11.2.7. Identify and use current Australian guidelines to provide appropriate general advice on nutrition, including strategies to improve exercise performance and recovery and body composition.

# 12. Physical Activity for Health

### 12.1. Guiding principle

An Accredited Exercise Scientist can describe, design and evaluate recommendations to increase physical activity and reduce sedentary behaviour at the population level.

### 12.2. Elements of Physical Activity for Health

An Accredited Exercise Scientist has demonstrated an ability to:

12.2.1. Explain the role of sedentary behaviour and physical activity in the aetiology, prevention and management of chronic conditions, mental health and disability.

12.2.2. Describe the potential impact of public policy on promoting physical activity and reducing sedentary behaviour in diverse populations.

12.2.3. Identify agencies involved in the promotion of physical activity and identify potential partners to assist with this promotion.

12.2.4. Apply and evaluate population-level recommendations and Australian guidelines for optimising physical activity and reducing sedentary behaviour across the lifespan.

12.2.5. Relate the benefits and risks of physical activity and apply evidence-based principles to recommend appropriate levels of physical activity for diverse populations.

12.2.6. Identify and assess populations at risk of insufficient physical activity or sedentary behaviour to inform development of appropriate recommendations and/or interventions.

# 13. Psychology of Health and Exercise

### 13.1. Guiding principle

An Accredited Exercise Scientist can apply evidence-based behavioural strategies to improve the health and fitness, well-being or performance needs of an individual or population.

### 13.2. Elements of Psychology of Health and Exercise

An Accredited Exercise Scientist has demonstrated an ability to:

13.2.1. Describe common social determinants of health factors that influence behaviour of health, physical activity and exercise.

13.2.2. Explain the role of physical activity and exercise in mental health and well-being.

13.2.3. Interpret evidence-based behavioural theories and their constructs that relate to health, physical activity, sport and exercise.

13.2.4. Interpret and analyse the factors that influence and predict exercise adherence.

13.2.5. Apply behavioural strategies according to the needs and preferences of the individuals and/or population and their progress towards achieving realistic goals.

13.2.6. Demonstrate the ability to communicate effectively and respond appropriately to assist clients from diverse populations to change their health and physical activity behaviours.

# 14. Research Methods and Data Analysis

### 14.1. Guiding principle

An Accredited Exercise Scientist can apply knowledge and skills of evidence-based approaches to practice as an Exercise Scientist and to experimental research.

### 14.2. Elements of Research Methods and Data Analysis

An Accredited Exercise Scientist has demonstrated an ability to:

14.2.1. Describe the primary types, applications and limitations of qualitative and quantitative research study designs.

14.2.2. Use research databases to access peer-reviewed scientific literature and conduct searches to identify relevant information.

14.2.3. Appraise research methods and reports, including statistical results to understand methodological and ethical aspects of research, and integrate this knowledge into all areas of exercise science practice.

14.2.4. Cite the research of others in written and oral communication.

14.2.5 Select and apply basic data analysis techniques appropriate to exercise science sub-disciplines.

# Glossary

***AES:*** Accredited Exercise Scientist

***Apply:*** to put to use for some practical purpose

***Client:*** a person or group that uses the services of an AES

***Client-centred:*** the approach to communication and interaction with a client, and the planning, delivery and evaluation of services, that is grounded in mutually beneficial partnerships among service providers, clients and families

***Diversity and Diverse Backgrounds:*** differences among groups of people and individuals that can encompass ethnicity, race, socioeconomic status, culture, exceptionalities, language, religion, sexual orientation, and geographical area and diverse genders, bodies, relationships and sexualities

***Exercise:*** intentional activity requiring physical effort, carried out to sustain or improve health and fitness. It is structured and planned

***Exercise Science:*** is an umbrella term for a set of specific sub-disciplines

***Evidence-based:*** applying the best available research outcomes (evidence) when making decisions about practice. AES professionals who perform evidence-based practice use research evidence along with professional expertise and client preferences to provide appropriate, client-centred services

***Health Assessment:*** a test to evaluate some aspect of a person's health, may be fitness related or well-being and can include written survey instruments and/or physical testing

***Individual:*** one person or a small group of people undertaking an activity as a collective

***In-person:*** face-to-face services provided directly to client (i.e. professional and client in the same room)

***Chronic Conditions:*** long lasting conditions with persistent effects that effect quality of life, such as mental health conditions, musculoskeletal, cardiovascular, and diabetes

***Motor Control:*** principles of motor control, motor learning and skill acquisition

***Performance:*** ability to perform at peak physical capabilities. Physical performance includes settings such as sport and job activities (e.g. defence and emergency forces)

***Physical Activity:*** any body movement that works muscles and uses more energy than used at rest

***Physiological Systems:*** main organ systems including cardiovascular, digestive, endocrine, immune, muscular, nervous, renal, reproductive, respiratory, and skeletal

***Population:*** groups of people that share various cultural, geographic and demographic factors

***Practice:*** in which the individual uses their knowledge and skills as a practitioner in their profession

***Preventative Health:*** improving an individual or populations' health to potentially mitigate unhealthy related medical conditions. Preventative health should include emerging areas such as mental health, obesity and pre-diabetes

***Risk Management:*** risk management and risk assessment concepts – considerations of the risk of a client's capabilities, environmental considerations (e.g., slips, trips and falls, policies and procedures) and infection control/good hygeine

***Social Determinants of Health:*** include the ecological, individual, social, cultural and economic factors influencing health outcomes

***Standard:*** the sub-discipline area consisting of a guiding principles and elements of graduate outcomes

***Sub-disciplines:*** the core areas of exercise science, being the fourteen standards outlined within this document

***Telepractice:*** Delivery of technology-based exercise and sports science services supporting wellness, prevention, health management and performance improvement. Setting include health, sport and education. Telepractice involves the transmission of information using telecommunication technologies including but not restricted to video, telephone and internet



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