Exercise & Sports Science Australia

Exercise Science Elements

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Contents

Preface

The ESSA Exercise Science Standards are based on the minimum professional requirements of graduates working in all areas of exercise science, and they have been developed in consultation with the ESSA membership and broader academic community. The standards provide a curriculum framework for university courses in exercise, sport and movement sciences, and they broadly define the minimum components of the *exercise science qualification*, which underpins Exercise Physiology and Sports Science accreditation with ESSA.

This has been the first major review of the exercise science standards since they were first developed as part of the ESSA membership criteria in the early 1990's. The revised standards combine elements of the traditional foundations of exercise science, along with a renewed emphasis on professional practice and the delivery of exercise services.

The standards are organised into fifteen study areas, each of which includes a guiding principle to outline the intent of the study area, and elements of graduate outcomes that are intended to form the basis of exercise science curricula. The core values and expectations of exercise science graduates are described in the graduate attributes, which bring together each of the study areas and apply to all aspects of exercise science practice.

With this revision there has been a deliberate shift away from a prescriptive set of criteria towards a suite of professional elements that acknowledge the breadth of exercise science. Study areas are ordered alphabetically, and there is no expectation that the elements within a study area will need to be embedded into specific courses or subjects. It is envisaged that this will provide academic units with the flexibility to integrate the minimum exercise science standards into unique program offerings that have emphasis in specific areas of expertise or local need. The revised standards will be incorporated into the ESSA individual and university (NUCAP) accreditation systems from 2015.

The Exercise Science Standards will undergo minor reviews annually and another major review within five years, no later than 2019.

I would like to sincerely thank the members of the ESSA Exercise Science Advisory Committee, the project leaders Melanie Sharman and Anita Hobson-Powell, and the ESSA members and academic experts who have made a direct and valuable contribution to the 2014 revision of the ESSA Exercise Science Standards.

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President – Exercise & Sports Science Australia
Chair – Exercise Science Advisory Committee

Members of the ESSA Exercise Science Advisory Committee

The 2014 revision of the ESSA Exercise Science Standards was led by the ESSA Exercise Science Advisory Committee.

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Graduate Attributes

Exercise science is a university Bachelor or postgraduate qualification that provides the graduate with the knowledge and skills to apply the science of exercise for health, fitness and sports performance.

Upon successful completion of a university course in exercise science, it is expected that a graduate can demonstrate:

1. An integrated understanding of the sub-disciplines of exercise science.
2. Application of the knowledge and skill sets of exercise science, including the design and delivery of exercise programs and assessments to meet the specific needs of apparently healthy clients.
3. Delivery of exercise programs for clients with pathology or injury that have been prescribed by an appropriately qualified health professional.
4. Practice that is within the scope of exercise science training, and recognition of the need to refer a client to other related professionals.
5. Conduct that is sensitive to client diversity and equity, and is consistent with the ESSA Code of Professional Conduct and Ethical Practice,
6. Evidence-based practice, including the ability to compile, critically evaluate, and communicate the scientific rationale for their professional decision making and service delivery.
7. Commitment to self-development in the field of exercise science through educational engagement and ongoing learning, self-evaluation of practice, inter-professional working relationships and the support of new graduates, and advocacy for exercise science.

Exercise Science Elements

1. Biomechanics

Guiding principle

Upon successful completion of the biomechanics curriculum, the graduate can describe, measure, analyse and evaluate, based on best practice, the mechanical principles underlying human movement as they apply to the unique needs of clients.

Assessment expectations

It is expected that learning in the biomechanics curriculum will be both theoretical and practical, with sufficient examination of practical skill competencies to ensure that graduates are able to accurately describe, analyse and evaluate human movement using basic biomechanical principles.

Elements of graduate outcomes

A graduate of an exercise science program can:

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

    a. health, exercise and sport from both performance-enhancement and injury-prevention perspectives
    b. injury, disability and disease as they relate to movement
    c. a scientific approach to ascertaining the aetiology of injury
    d. the physical effects of human interaction with equipment and the environment.

2. Apply the principles of the biomechanical analysis of human movement in the context of health, exercise, sport and activities of daily living in a variety of populations.

3. Explain the nature of biomechanical problems and how qualitative and/or quantitative analysis can be interpreted to develop and implement intervention strategies relevant to the movement context.

4. Determine when basic movement analysis can add value to the needs of a client.

5. Demonstrate skill in conducting and interpreting basic biomechanical measurements relevant to clients' needs.

6. Communicate scientific data and movement techniques to clients, colleagues and other professionals with appropriate use of illustrations and user-friendly terms.

7. Identify specific aspects of movement patterns, particularly for movement asymmetry.

8. Integrate knowledge of and skills in biomechanics with other study areas of exercise science.

2. Exercise Delivery

Guiding principle

Upon successful completion of the exercise delivery curriculum, the graduate can deliver, in-person or remotely, an exercise program that includes the instruction and leadership of individual and group exercise sessions and is based on best practice to meet the specific health, fitness and/or sports performance goals of apparently healthy clients.

In addition, the exercise science graduate must be able to deliver an exercise program for clients with pathology or injury that has been prescribed by an appropriately qualified health professional.

Assessment expectations

It is expected that the exercise delivery curriculum will be predominantly practical, through which graduates will have demonstrated the necessary practical skills to ensure that they are suitably prepared for leading exercise programs and sessions for clients.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Employ a range of tools and methods to monitor and evaluate exercise load and progress, including mechanical, physiological and perceptual methods that are appropriate for the specific needs of clients.

2. Demonstrate how data obtained during a client assessment are used in the delivery and monitoring of exercise or physical activity.

3. Identify, describe, analyse and demonstrate a broad range of exercise modalities, and select appropriate exercises and equipment to suit the needs and abilities of clients.

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

5. Apply the principles of motor learning and skill acquisition, including the effective use of learning cues and movement progressions, for teaching and correcting movement and exercise technique.

6. Instruct group-based exercise classes for distinct groups of clients with health, fitness and sports performance goals.

7. Identify the common contraindications for participation in exercise that are associated with chronic and complex conditions, and demonstrate an awareness of the relevant pathophysiology that underpins such contraindications.

8. In accordance with professional guidelines, monitor and evaluate whether it is safe for a client to continue with an exercise program or session, and initiate appropriate measures to ensure the client's safety.

9. Evaluate and adapt the delivery of an exercise prescription to respond to environmental change or change in the needs or capacities of clients.

10. Employ motivational techniques to deliver safe and effective exercise programs in a manner that is sensitive to the specific needs and abilities of clients.

11. Record and document the responses and progress of clients during an exercise program, and appropriately report on the outcomes, verbally or in writing, to clients or related professionals.

12. Integrate knowledge of and skills in exercise delivery with other study areas of exercise science.

3. Exercise Physiology

Guiding principle

Upon successful completion of the exercise physiology curriculum, the graduate can demonstrate the ability to apply knowledge of the effects of acute and chronic exercise on the physiological systems necessary to evaluate, improve and maintain health, fitness and performance of the client.

Assessment expectations

It is expected that learning in exercise physiology will be assessed through appropriate written comprehension, application and evaluation of knowledge.

Elements of graduate outcomes

A graduate of an exercise science program can:

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

1. Describe the individual and integrated physiological responses and adaptations to acute and chronic exercise.

2. Describe the physiological responses and adaptations to acute and chronic exercise in various environmental conditions and the interactions with ‘ergogenic’ aids or technologies.

3. Apply knowledge of the physiological responses to acute exercise and the adaptations to chronic exercise to provide a rationale for the provision of exercise programs to improve and maintain specific aspects of health, fitness and performance.

4. Interpret, explain and analyse physiological data obtained during acute exercise, and compare such data between time points, individuals and populations.

5. Integrate knowledge of and skills in exercise physiology with other study areas of exercise science.

4. Exercise Prescription

Guiding principles

Upon successful completion of the exercise prescription curriculum, the graduate can design, and modify as necessary, safe, appropriate and effective exercise programs, based on best practice, for the apparently healthy population, in a variety of environments that are aligned with the health, fitness and performance needs and goals of clients.

Assessment expectations

It is expected that the exercise prescription assessment will involve graduates' demonstration of exercise prescription, which requires the comprehension, application, evaluation and communication of relevant knowledge.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Identify and describe the principles of current best practice for designing exercise programs, and explain why various exercise types confer health, fitness or performance benefits (as relevant) for the apparently healthy population.

2. Explain in simple, comprehensible language the risks of performing exercise and describe appropriate strategies to address these risks.

3. Design exercise programs that meet the needs of clients, in consideration of:

    a. current, best-practice guidelines for performing exercise

    b. the exercise tolerance, physical function and capacity, and motivation level of the client

4. Integrate knowledge of and skills in exercise prescription with other study areas of exercise science.

5. Functional Anatomy

Guiding principle

Upon successful completion of the functional anatomy curriculum, the graduate will have a thorough knowledge of the neuro-musculoskeletal system and an understanding of all body systems relevant to exercise science.

Assessment expectations

It is expected that learning in the functional anatomy curriculum will be assessed through a mixture of written and practical modes that require the comprehension of theoretical knowledge; the ability to identify anatomical structures; and the ability to measure, interpret and apply that information in the practical exercise setting.

Elements of graduate outcome

A graduate of an exercise science program can:

1. Identify the foundational principles of kinesiology that explain individual joint complexes and their independent and composite functions in posture and movement analysis in exercise.

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

3. Describe the effects of exercise, immobilisation, aging and injury on the musculoskeletal system of the human body.

4. Discuss the role of body proportions in sports performance and talent identification.

5. Describe the adaptations that can occur during exercise to elements of the neuro-musculoskeletal system.

6. Conduct musculoskeletal movement analyses.

7. Analyse and evaluate results from anthropometric, flexibility and posture testing, and present a summary of recommendations for exercise prescription.

8. Analyse movement during prescribed exercises, identifying which muscles are active in producing and controlling a movement of a particular joint. Integrate knowledge of

functional anatomy with other exercise science sub-disciplines, and apply this knowledge in health, exercise, sports and workplace contexts.

6. Growth and Development

Guiding principle

Upon successful completion of the growth and development curriculum, the graduate will have a thorough understanding of how age and gender influence exercise capacity, and how physical activity can influence changes in the human body, from conception to old age.

Assessment expectations

It is expected that learning in the growth and development curriculum will involve written assessment of the comprehension, analysis and evaluation of relevant theoretical knowledge.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Recall and describe the stages of growth and development across the lifespan, from conception through to death (including pregnancy in women).
2. Recognise exercises that are contraindicated for particular stages of growth and development across the lifespan, and know the injuries or conditions that commonly present during certain stages of growth and development.
3. Describe the structural, physiological and motor development changes across the lifespan and the effect of exercise on such changes.
4. Analyse and evaluate the literature and guidelines on growth and development as they relate to exercise.
5. Integrate knowledge of and skills in growth and development with other areas of exercise science.

7. Health, Exercise and Sport Assessment

Guiding principle

Upon successful completion of the health, exercise and sport assessment curriculum, the graduate can, based on best practice, competently and safely conduct a health and exercise evaluation, assess physical activity status, perform common sport-related assessments, interpret the results and communicate the findings.

Assessment expectations

It is expected that learning in this study area will be assessed through practical tasks and examinations of practical skills that require graduates to identify, describe and conduct health, exercise and sport-related assessments accurately and safely.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Identify and explain the common processes and equipment required to conduct accurate and safe health, exercise and sport-related assessments.

2. Identify and describe the limitations, contraindications or considerations that may require the modification of assessments, and make appropriate adjustments for relevant populations or clients.

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

4. Describe the principles and rationale for the calibration of equipment commonly used in assessments, and recognise and adjust incorrectly calibrated equipment.

5. Conduct appropriate pre-assessment procedures, including explaining the test, obtaining informed consent and a focused medical history, and performing a pre-exercise risk assessment.

6. 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. Select, develop and conduct appropriate protocols for safe and effective assessments, including instructing clients on the correct use of equipment.

8. Record, analyse and interpret information from assessments and convey the results, including the accuracy and limitations of the assessments, through relevant verbal and/or written communication with the client or involved professional.

9. Integrate knowledge of and skills in health, exercise and sport assessment with other study areas of exercise science, in particular the physiology that underpins common exercise contraindications.

8. Health, Exercise and Sport Psychology

Guiding principle

Upon successful completion of the health, exercise and sport psychology curriculum, the graduate can use best-practice behavioural strategies that align with the unique needs of a client or a group of clients.

Assessment expectations

It is expected that learning in the health, exercise and sport psychology curriculum will be assessed through tasks that require graduates to identify, describe, analyse, apply and evaluate integrated knowledge and skills. The use of case studies that include a behavioural component will ensure that graduates are suitably prepared for delivering an exercise program to a client.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Describe human behaviour in terms of personality, motivation and learning, and relate these influences to the behavioural aspects of health, exercise and sport.
2. Analyse and understand behaviour in the health, exercise and sport contexts from an ecological perspective.
3. Identify and describe best practice in the delivery of health and exercise advice.
4. Describe the factors associated with realistic goal setting, exercise adoption and safe participation in physical activity.
5. Describe the factors that influence and predict exercise adherence.
6. Explain the role of exercise, physical activity and sport in mental health and wellbeing.
7. Interpret behavioural theories and their constructs that relate to health, exercise and sport.
8. Apply relevant psychosocial measures and behavioural tools in the delivery of an exercise program.

9. Formulate strategies for behaviour modification to increase the adherence of clients to exercise and physical activity throughout the lifespan.

10. Identify clients in need of additional strategies for behaviour modification and design an intervention accordingly.

11. Evaluate and revise behavioural strategies according to the needs of the client and their progress towards achieving realistic goals.

12. Listen to and engage with the client and respond appropriately to match their various needs and preferences with realistic goals and safe, progressive improvement.

13. Demonstrate basic counselling and communication skills.

9. Human Anatomy

Guiding principle

Upon successful completion of the human anatomy curriculum, the graduate will have a thorough knowledge of the musculoskeletal system, and an understanding of human anatomy relevant to exercise science.

Assessment expectations

It is expected that learning in the anatomy curriculum will be assessed through written and practical tasks that require demonstration of key conceptual and theoretical knowledge and the ability to identify anatomical structures.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Locate components of the body systems, with an emphasis on musculoskeletal structures, using a variety of tools such as cadaveric specimens, anatomical models, radiographic images, and diagrams and photographs (in print or electronic media).

2. Identify the components of the musculoskeletal system and their key parts and describe the operation of the musculoskeletal system in detail.

3. Identify and describe the basic structures and organisation of the other systems in the body, including their interrelationship/interdependence, with emphasis on the cardiovascular, nervous and respiratory systems.

4. Identify musculoskeletal structures from surface anatomy.

5. Integrate the knowledge of and skills in human anatomy with other study areas of exercise science.

10. Human Physiology

Guiding principle

Upon successful completion of the human physiology curriculum, the graduate will demonstrate a general understanding of human biological function from cellular to organism level, with specific emphasis on the mechanisms for the integrated regulation of the human body.

Assessment expectations

It is expected that learning in the human physiology curriculum will be assessed through written tasks that require graduates to describe, apply and integrate key conceptual and theoretical knowledge.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Describe, understand and integrate the functions and needs of the various tissues, organs and systems, and how they relate to health and common pathologies and their pharmacological treatments, especially in the context of exercise delivery.

2. Measure basic physiological parameters, perform basic analyses, and interpret and analyse the data, taking into account the limitations of the methodology on the conclusions that can be drawn.

3. Demonstrate an appreciation of the importance of scientific rigour in responding to the demand for evidence-based models and in developing a deeper understanding of the functioning of the human body.

4. Integrate the mechanisms of different physiological systems.

5. Integrate knowledge of and skills in human physiology with other study areas of exercise science.

11. Motor Control and Learning

Guiding principle

Upon successful completion of the motor control and learning curriculum, a graduate can interpret the theoretical basis of motor control and learning to select and perform assessments of motor skills. The graduate can also design a suitable program, based on best practice, for teaching motor skills to meet the unique needs of clients.

Assessment expectations

It is expected that learning in the motor control and learning curriculum will be assessed through written tasks that require graduates to identify, describe, analyse and integrate key conceptual and theoretical knowledge. Practical tasks will assess a graduate's capacity to conduct and interpret common motor control assessments, and to design and evaluate environments and protocols for motor learning and skill acquisition.

Elements of graduate outcomes

A graduate of an exercise science program can:

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

2. Identify the strengths and limitations of techniques to assess aspects of motor control and the processes of motor learning and skill acquisition.

3. Explain the changes in motor function or motor performance that may occur with motor learning, skill acquisition, aging and injury.

4. Discuss the common theoretical models proposed to explain motor control and the processes of motor learning and skill acquisition.

5. Examine aspects of a client's motor function or motor performance as appropriate in health, exercise and sporting contexts.

6. Use appropriate test protocols to imply motor learning outcomes.

7. Design motor learning environments and protocols to maximise each client's specific motor control and learning outcomes, as appropriate in health, exercise or sporting contexts.

8. Integrate knowledge of and skills in motor control and learning with other study areas of exercise science.

12. Nutrition

Guiding principle

Upon successful completion of the nutrition curriculum, graduates will have the knowledge and skills to provide general advice on nutrition to apparently healthy clients.

Assessment expectations

It is expected that learning in the nutrition curriculum will be assessed through appropriate comprehension, application and evaluation of knowledge and performance of basic skills relevant to this study area.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Describe the basic functions of macronutrients and key micronutrients, their common sources, and their role in energy balance and general wellbeing.
2. Identify the strengths and limitations of commonly used methods for measuring and analysing dietary intake.
3. Recognise the signs of inappropriate dietary behaviours, and understand appropriate referral pathways.
4. Describe the role of diet in the aetiology of obesity and explain the metabolic and chronic health consequences of obesity.
5. Explain the strengths and limitations of commonly used methods for measuring and analysing body composition.
6. Describe the evidence for the efficacy of common nutritional supplements and nutritional 'ergogenic' aids, and demonstrate awareness of prescribed or illegal supplements.
7. Address common questions on nutrition, specifically those related to exercise performance, changes in body composition, the role of diet in increasing muscle mass, and the nutritional causes of fatigue.
8. Evaluate the risks to physiological and psychological health of common fad or popular diets.

9. Undertake a basic dietary analysis and discuss its implications.

10. Use current guidelines to provide appropriate general advice on nutrition.

11. Relate appropriate information on nutrition and hydration for exercise preparation, exercising and exercise recovery.

12. Integrate knowledge of and skills in nutrition with other study areas of exercise science.

13. Physical Activity and Health

Guiding principle

Upon successful completion of the physical activity and health curriculum, the graduate will be able to design a basic population intervention, based on best practice, to increase physical activity and reduce sedentary behaviour.

Assessment expectations

It is expected that learning in the physical activity and health curriculum will be assessed through written comprehension, application and evaluation of relevant content.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Describe in detail prevention programs at the public health, primary, secondary and tertiary levels.
2. Describe the broad structure of the health system in Australia.
3. Explain the role of sedentary behaviour and physical activity in the aetiology, prevention and management of lifestyle-related chronic diseases.
4. Describe, and provide examples of, the potential impact of public policy on promoting physical activity and reducing sedentary behaviour at the population level.
5. Identify agencies, including funding agencies, involved in the promotion of physical activity, and identify potential partners to assist with this promotion.
6. Apply population-level recommendations and guidelines for optimising physical activity and reducing sedentary behaviour throughout the lifespan.
7. Relate the benefits and risks of physical activity and apply best-practice principles to recommend appropriate levels of physical activity for populations and subgroups.
8. Identify populations at risk of insufficient physical activity or sedentary behaviour, and assess population characteristics and needs, including the social determinants of health, to inform development of appropriate interventions.
9. Plan, organise and evaluate population and community-level interventions to increase physical activity levels and reduce sedentary behaviour.

10. Discuss the appropriate use (including expected outcomes), strengths and weaknesses of individual and population-level interventions to increase physical activity and reduce sedentary behaviour.

11. Integrate knowledge of and skills in physical activity and health with other study areas of exercise science.

14. Professional Practice

Guiding principle

Upon successful completion of the curriculum in the professional practice of exercise science, a graduate can apply their knowledge and skill set to operate effectively in an ethically responsible manner.

Assessment expectations

It is expected that graduates will be assessed on both professional criteria and context-specific criteria through authentic practicum experiences. It is also expected that the preliminary learning necessary to engage in practicum will be assessed.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Demonstrate the effective application of knowledge and skills in a work context.
2. Demonstrate helping clients to meet their goals through the integration and application of the exercise science curriculum.
3. Demonstrate effective verbal and nonverbal communication skills.
4. Understand the scope of practice for an exercise scientist, a sports scientist and an exercise physiologist.
5. Understand the elements of risk associated with the professional practice of exercise science and the strategies used to minimise this risk.
6. Understand the ESSA Code of Professional Conduct and Ethical Practice.

15. Research Methods and Statistics

Guiding principle

Upon successful completion of the research methods and statistics curriculum, the graduate can analyse and evaluate research literature for use in nonclinical or research environments, and apply appropriate results in a clinical context. The graduate can also perform basic statistical analyses and interpret the results of statistical tests commonly used in the literature on health, exercise and sports science.

Assessment expectations

It is expected that assessment of the research methods and statistics curriculum will involve written tasks to demonstrate capacity to retrieve and critically analyse research literature, to understand and perform basic statistical calculations and analyses and to interpret statistical data.

Elements of graduate outcomes

A graduate of an exercise science program can:

1. Describe the types and applications of qualitative and quantitative research study designs.
2. Differentiate between high and lower quality sources of information to inform evidence-based practice.
3. Use the primary databases to access peer-reviewed scientific literature and conduct searches to identify relevant information.
4. Critically appraise research methodology and reports, including statistical results and ethical aspects of research, and integrate this knowledge into other study areas of exercise science.
5. Cite the research of others appropriately in written work.
6. Understand and perform relevant statistical analyses and interpret results.

Glossary

Overarching definitions

Analyse: Break information into parts to explore understanding and relationships (comparing, organise, deconstruct, interrogate, find)

Apply: Use information in another familiar situation (implement, carry out, use, execute)

Best practice: On the basis of all available evidence the practice can be expected to produce the most favourable outcome

Client: Individuals, groups, teams or organisations who use the services of an exercise science professional

Describe: Give a detailed account of in words

Evaluate: Justify a decision or course of action (check, hypothesise, critique, experiment, judge)

Exercise: A specific type of physical activity that is repetitive and planned with the objective of improving or maintaining physical activity. Exercise includes various exercise modalities such as endurance, anaerobic, flexibility, resistance, balance and agility exercise, which can be performed over a range of intensities, frequencies and durations within a variety of environments

Exercise science: The science of exercise for health, fitness and sports performance

Identify: Establish or indicate what something is

Integrate: Combine (one thing) with another to form a whole

Physical activity: A general term for any body movement performed with skeletal muscles that results in an increase in energy expenditure

Sport: Physical activity capable of achieving a result and requiring physical exertion and/or physical skill, and which, by its nature and organisation, is competitive

Understand: Explain ideas or concepts (interpret, summarise, paraphrase, classify, explain)

Definitions within study areas

For the readers' convenience, the following part of the glossary has been divided into study areas; consequently, some entries are repeated.

Biomechanics

Analysing: Describing the characteristics of human movement from qualitative and quantitative perspectives

Biomechanical services: The design, conduct and reporting of biomechanical analysis in research, scientific support (e.g. elite sport), education and consultancy

Biomechanics: The study of biological systems from an anatomical and a mechanical perspective

Mechanics: A branch of physics that, in the exercise and sport context, is involved with the anatomical and dynamic aspects of human movement and the surfaces and equipment involved

Movement asymmetry: Imbalances in bilateral muscle strength

Physical effects of human interaction with equipment and the environment: Interactions with various types and conditions of sport surfaces and environmental conditions

Technique: The pattern and sequence of movements required to produce the prescribed action efficiently, or an efficient and competitive action, or the desired action efficiently

Exercise delivery

Apparently healthy client: Clients who are considered on the basis of their health status to be at low risk of adverse events during exercise. Includes children, adolescents, older adults, pregnant women (including women from early pregnancy to late-stage post-partum), and clients requiring weight management

Data: Recording information/measurements on heart rate, blood pressure, workload, risk status and training or activity history

Exercise delivery: The implementation of an exercise program for individuals or groups, with a particular emphasis on the practical aspects of leadership of exercise sessions. Mode of delivery may be face-to-face or distance

Exercise load: Components of exercise prescription that, for a given type and mode of exercise, contribute to the exercise 'dose'; includes intensity, frequency, duration, work-to-rest ratio, recovery time and movement rate

Prescribing: Designing an exercise program

Safety measures: May include modifying or ceasing exercise, application of first aid, or referral to another medical or health professional

Exercise physiology

Acute exercise: A single bout of activity that involves static and/or dynamic muscle activation at any given intensity from rest to maximal exercise and back to rest

Chronic exercise: Repeated bouts of acute exercise, either structured or unstructured; exercise training

Individual: A person of any age or sex, at any level of physical, functional or health status

Physiological system: A system that contributes to the functioning of the human body. In exercise science, the systems of interest are the nervous, musculoskeletal, cardiovascular, respiratory, endocrine, renal, digestive, immune, reproductive and integumentary systems

Exercise prescription

Current exercising guidelines: Exercising guidelines published by reputable authoritative sources, such as those provided by the American College of Sports Medicine and Exercise & Sports Science Australia

Exercise environments: A broad range of settings that may be land or water based, commercial or private, supervised or unsupervised, and involve extremes of climate

Physical function and capacity: Measures of cardiorespiratory, musculoskeletal and neuromuscular abilities

Health, exercise and sport assessment

Assessment: Health, exercise, physical activity and sport-related assessment

Fitness: Attributes and capabilities that relate to the capacity to perform exercise or sport and are associated with a low risk of premature development of hypokinetic diseases

Health and fitness evaluation: A process that includes pre-exercise screening and risk appraisal; measurement of components that contribute to physical fitness, including cardiorespiratory endurance, muscular strength and fitness, flexibility and body composition;

analysis and interpretation of the test results; and provision of feedback to the participant and other relevant personnel (e.g. other health professionals)

Medical supervision: Supervision of a test by a registered medical practitioner or physician

Sport-related assessment: Tests that assess attributes and capacities relevant to the ability to perform specific or general activities in sporting contexts; includes analysis and interpretation of test results and the provision of feedback to the participant and other relevant personnel (e.g. coach)

Health, exercise, and sport psychology

Adoption: Participation in, or the initiation of, exercise or physical activity

Adherence: The continued fidelity to participation in and maintenance of exercise or physical activity

Ecological: Encompassing an integrated understanding of the complex array of intrapersonal, interpersonal, cultural, biological and environmental influences on behaviour

Human physiology

Physiological system: A system that contributes to the functioning of the human body. In exercise science, the systems of interest are the nervous, musculoskeletal, cardiovascular, respiratory, endocrine, renal, digestive, immune, reproductive and integumentary systems

Motor control and learning

Motor control: A sub-discipline of human movement concerned with understanding the processes that underlie the acquisition, performance and retention of motor skills

Motor learning/skill acquisition: Changes in motor control that occur as a consequence of practice (or adaptation); focuses on how skills are learnt and the changes in performance, retention and control mechanisms that accompany skill acquisition

Nutrition

General nutrition advice: Advice that considers the client's age and gender, but is general in nature, not prescriptive; in accordance with current evidence-based guidelines for Australians

Physical activity and health

Health system: A system for the delivery of health services; includes private and public systems, and state and federal systems

Intervention: Any program or policy intended to increase physical activity or decrease sedentary behaviour

Physically active: Describes the proportion of the population that meets the Australian Physical Activity Guidelines

Insufficiently active: Describes the proportion of the population that does not meet the Australian Physical Activity Guidelines

Population: May refer to the whole population or a defined subpopulation (e.g. older adults)

Primary prevention: Seeks to limit disease by controlling causes and risk factors. Efforts can be directed at the whole population, with the aim of reducing average risk; or target people (subgroups) at higher risk

Secondary prevention: Seeks to reduce the more serious consequences of disease through early diagnosis and treatment, most typically via screening programs

Tertiary prevention: Seeks to reduce the progress or complications of established disease (e.g. rehabilitation programs)

Principles of screening: The presumptive identification of unrecognised disease or defects by means of tests, examinations or other procedures that can be applied rapidly. A screening test is not intended to be diagnostic

Sedentary behaviour: Activities that have a low energy requirement

Professional practice

Practicum: Work conducted by a student at a work site (often external to the university) as part of the professional practice curriculum

Professional practice: Includes all aspects of curriculum related to work-based learning, including engagement in the practicum

Research methods and statistics

Databases: Any bibliographic database of scientific and biomedical information (e.g. Medline, Scopus, CINAHL, Embase, SPORTDiscus)

Information retrieval: Searching for documents, for information within documents, and for metadata about documents, as well as searching relational databases and the internet

Research design: Turning a research question and hypothesis into a testing project

Statistical calculations: Data and its distribution; also includes descriptive, comparative and relationship statistics