Sport Science

LEVEL 3	15 TCE CREDIT POINTS
COURSE CODE	SPT315118
COURSE SPAN	2018 — 2025
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	NO

This course was delivered in 2022. Use A-Z Courses to find the current version (if available).

The course is intended to provide learners with broad experience and awareness of contemporary practice across the Sport Science fields

In preparation for further study and/or vocational pathways the course also aims to develop understandings around how Sport Science practices are applied in various amateur, semi-professional and high performance sport settings and a wide range of sports, industry and related roles. Learners are encouraged to undertake high-order thinking and are challenged to consider the complex cross-discipline links between core areas of study in addition to completing scientific investigative studies.

Course Description

Sport Science is the practical application of scientific principles and knowledge to exercise and sport.

This course is designed for learners who wish to expand their skills and understanding in Sport Science through a theoretical and applied understanding of the factors which influence sporting performance.

The course is underpinned by a focus on understanding the world of competitive sport, and is delivered in the context of building moral and professional ethics, exploring the balance required for maximising holistic outcomes for athletes and relating theory knowledge and concepts to their application in various performance settings.

Sport Science encompasses the individual and collective significance of physiological, skills acquisition and psychological components in analysing and improving human sports performance.

The course examines three discipline areas:

1. Exercise Physiology, including: the study and preparation of athletes; how to improve their performance under stress in both training and competition; how their bodies produce energy for physical activity; understanding how they recover; the theory behind training programs; and what it means physiologically to be fit.
2. Skill Acquisition, including motor skills and learning, particularly focussing on: teaching and coaching; the importance of reaction time; and the study of biomechanics, including the use of technology to analyse and improve skill execution.
3. Sport Psychology examines the mental aspects required for preparing participants for sporting activities. It also considers the cognitive processes that occur and how they impact on sporting performance.

The field of Sport Science requires an understanding of connections and cross-discipline links between various performance components. This integration across related disciplines working in synergy is what enables high-performance athletes to consistently generate, analyse, develop and replicate or build on their peak performances.

Learners will undertake a range of practical laboratory experiences and applied activities. Learners will also engage in high order thinking as they are challenged to consider complex cross-discipline links between core areas of study as they complete classwork, practical activities and scientific investigative studies.

Rationale

Sport Science is a Level 3 course in the Sport group of the Health and Physical Education (HPE) suite of courses. *Sport Science* is a rapidly expanding field* which encompasses the physiological, psychological and skill acquisition components involved with planning and analysing human performance.

This course balances a theoretical focus with a range of applied experiences designed to allow learners to develop their skills, knowledge and understanding of issues related to the training and performance of athletes of all ages and levels.

The course integrates science, literacy and numeracy concepts developed in the Australian Curriculum F–10 and helps connect to future learning in a range of: allied health; exercise science; human movement; and performance sport related areas.

The course is intended to provide learners with broad experience and awareness of contemporary practice across the *Sport Science* fields. In preparation for further study and/or vocational pathways the course also aims to develop understandings around how *Sport Science* practices are applied in various amateur, semi-professional and high performance sport settings and a wide range of sports, industry and related roles.

Learners are encouraged to undertake high-order thinking and are challenged to consider the complex cross-discipline links between core areas of study in addition to completing scientific investigative studies.

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* http://www.deakin.edu.au/students/faculties/faculty-of-health/school-of-exercise-and-nutrition-sciences/careers/exercise-and-sport-science/sport

Aims

Sport Science aims to provide learners with opportunities to:

- examine human systems and function during exercise, and how physical activity impacts health from cellular to the broader holistic level
- explore a variety of specialised fields and discipline areas related to HPE and how, individually and in combination, they can contribute to developing and improving performance
- organise and reflect on relevant content and through analysis and discussion, connect key concepts in relation to contemporary practice and the broader HPE learning area context
- build a range of academic and lifelong learning skills in preparation for tertiary study or employment
- demonstrate specific knowledge of key concepts, language, conventions, ethos, and areas of study specific to this field
- experience the specialised skills, standards, practices, expectations needed to pursue pathways of future work or study related to the sport sciences.

Learning Outcomes

On successful completion of this course, learners will be able to:

1. analyse and interpret theory supporting current practices in exercise physiology, skill acquisition, and sport psychology
2. differentiate and explain how exercise physiology, skill acquisition, and sport psychology, contribute in isolation and combination to influence sporting performance
3. utilise analytical and interpretive skills to solve problems and process data
4. undertake scientific research activities and summarise ethical issues related to human research studies
5. identify, describe and recall facts, definitions, terminology and principles as they relate to various contexts through the study, observation of, and engagement in, physical activity
6. integrate and apply understanding across the disciplines of exercise physiology, skill acquisition, and sport psychology to develop appropriate strategies for improving performance in various sporting contexts
7. select, interpret, analyse and manipulate information from a variety of sources
8. identify and communicate solutions to problems or practical situations and scenarios in exercise physiology, skill acquisition, and sport psychology

Access

Learners must have basic knowledge and understanding of the body's respiratory, circulatory and muscular systems.

Pathways

Sport Science Level 3 builds on concepts from the Australian Curriculum 9–10 Health and Physical Education v8.2 :

Strand – Personal Social and Community Health
Focus Areas:

- Communicating and interacting for health and wellbeing
- Contributing to healthy active communities

Strand – Movement and Physical Activity
Focus Areas:

- Understanding movement

Sport Science – Foundation Level 2, Athlete Development Level 2 or courses in the broader area of human biology provide pathways into this course.

This course provides a strong basis for students going on to further vocational and/or tertiary study including: Health and Allied Health careers; Human Movement; Exercise Science; Education; Health Science; Physiotherapy; Personal Training; coaching and other sport-related careers.

Resource Requirements

Providers of this course must ensure learners have access to video camera(s) and ICT tools for the movement analysis investigative study.

Suitable packages – such as SkillSpector, Kinovea, and Hudl technique – are available without cost.

High-performance sport is an evolving, dynamic and technology-connected area. Sport Science research tasks and laboratory sessions will require students to be able to access a range of suitable performance testing equipment, software and facilities. Movement analysis will also require students to use suitable filming devices, IT software and hardware.

Course Size And Complexity

This course has a complexity level of 3.

At Level 3, the learner is expected to acquire a combination of theoretical and/or technical and factual knowledge and skills and use judgment when varying procedures to deal with unusual or unexpected aspects that may arise. Some skills in organising self and others are expected. Level 3 is a standard suitable to prepare learners for further study at tertiary level. VET competencies at this level are often those characteristic of an AQF Certificate III.

This course has a size value of 15.

Relationship To Other TASC Accredited And Recognised Senior Secondary Course

Sport Science Level 3 extends on some of the topics and content areas which appear in the Sport Science – Foundation Level 2 and Athlete Development Level 2 courses.

While learners who are studying these courses either sequentially or concurrently may have some advantages in dealing with familiar terms and broad concepts, Sport Science examines those topics with much greater depth and detail and a significantly different perspective.

Course Delivery

The order for delivery and assessment of Units in this course is not prescribed. Within each Unit, it is recommended that the given sequence of topics/sub-topics is retained.

Cross-Discipline Links
Complex cross-discipline links exist between Exercise Physiology (Units 1 and 2), Skill Acquisition (Unit 3) and Sport Psychology (Unit 4), hence the various units and topics they contain may have more limited meaning if they are treated discretely.

Learners are required to identify and explain links between the topics/sub-topics studied across the three discipline areas Units. For example, there are many links between topics covered in Unit 3 (Skill Acquisition) and those studied in Unit 1 and 2 (Exercise Physiology), and Unit 4 (Sport Psychology). A specific example of this is how an athlete's response time (Skill Acquisition) can be improved through isotonic resistance training (Exercise Physiology).

The study of such cross-discipline links involves applying logical, critical and innovative thinking to a range of problems and ideas, and transferring knowledge and skills, as well as making connections between the three disciplines.

The study of cross-discipline links should be:

1. integrated during the year, and
2. reinforced following the delivery of all the Units.

Timing of the study of cross-discipline links will necessarily vary depending on the provider's choices regarding the sequence of delivery of Units and topics/sub-topics.

Course Requirements

There are five (5) Units in this course.

Learners will undertake study of ALL units and ALL topics/subtopics.

In Unit 5, learners will complete one (1) compulsory study, and one (1) selected study.

Course Content

There are five (5) units in this course:

Unit 1: Exercise Physiology A
Unit 2: Exercise Physiology B
Unit 3: Skill Acquisition
Unit 4: Sport Psychology
Unit 5: Scientific Investigative Methodologies and Skills

While each of the Units is presented below as a discrete Unit, they are closely interrelated. Providers can be flexible in the way they choose to arrange the delivery of the content at the Unit and topic level. For example, to create an opportunity to highlight a cross-discipline link a provider may choose to deliver a topic from Unit 3 and reinforce or make comparisons with a topic from Unit 1.

Cross-discipline links between Units/topics will be identified and discussed as they occur.

It is recommended that Units 1, 2, 3 and 4 are allocated approximately equal delivery time.

Unit topics/sub-topics may be delivered as purely theoretical studies or as studies contextualized within practical activities.

UNIT 1: EXERCISE PHYSIOLOGY A
Topics

1.1 Energy and Energy Systems
1.2 Oxygen Delivery
1.3 Effects of Training

1.1 Energy and Energy Systems

- Energy
- Role of ATP:
    - structure
    - high energy bonds
- Energy sources to replenish ATP:
    - creatine phosphate
    - carbohydrates (low glycaemic index foods and high glycaemic foods)
    - fats
    - protein
    - concept of “Hitting the Wall”
    - glycogen sparing
- ATP production:
    - during resting conditions
    - during exercise
    - ATP splitting
    - ATP storage and transportation
- Phosphagen (ATP – CP or Anaerobic Alactic System):
    - basic equations (not including enzymes)
        - characteristics:
        - metabolism (method of energy production)
        - fuel sources
        - speed of ATP production
        - quantity of ATP production (relative, i.e. not a specific amount)
        - limitations
        - duration (predominant)
        - intensity
        - provide sporting examples
        - muscle fibre type
- Lactic acid (Anaerobic Glycolysis) system:
    - equations of the energy system (not including enzymes)
    - lactate clearance, lactate accumulation, Hydrogen Ions and Acidosis
    - characteristics:
        - metabolism (method of energy production)
        - fuel sources
        - speed of ATP production

            - quantity of ATP production (relative, i.e. not a specific amount)
            - limitations
            - by-products
            - duration (predominant)
            - intensity
            - provide sporting examples
            - muscle fibre type
        - lactic acid removal (fate of lactic acid)
- Aerobic System:
    - basic equations/flow chart, includes basic outline of Krebs Cycle and Electron Transport System (not including enzymes)
    - fate of the by-products (heat, water and carbon dioxide)
    - glycolysis
    - lypolysis
    - characteristics
        - metabolism (method of energy production)
        - fuel sources
        - speed of ATP production
        - quantity of ATP production (relative, i.e. not a specific amount)
        - limitations
        - by-products
        - duration (predominant)
        - intensity
        - provide sporting examples
        - muscle fibre type
- Oxygen Transport in muscles; role of myoglobin
- Energy Continuum: interplay of the different energy systems:
    - contribution of energy systems varies depending on
        - duration
        - intensity
        - aerobic fitness
    - aerobic energy system makes a greater contribution earlier than previously thought
    - discussion: fat adapted vs glycogen adapted metabolism
- Muscle Fibre Types: Slow (Type I) and Fast (Type IIa and Type IIb):
    - profile characteristics of each

1.2 Oxygen Delivery

- Oxygen Deficit
- Aerobic Steady State
- VO_2 and VO_2 Max:
    - absolute and relative VO_2 Max (including making calculations)
    - in relation to athletes in different sports and fitness levels
        - discuss demands of endurance sports, intermittent team sports, player roles, etc...
        - comparison in typical novice, intermediate and high performance athletes
    - factors that affect an individual's VO_2 Max
        - aerobic fitness
        - body size
        - gender
        - heredity
        - age
- Lactate Inflection Point (Onset of Blood Lactate Accumulation):
    - variability of Lactate Inflection Point (LIP) as a percentage of VO_2 maximum and maximum heart rate
    - improving your Lactate Inflection Point (LIP)
    - buffering
    - LIP and VO_2 Max

1.3 Effects of Training

- Acute Responses (immediate effects) of exercise:
    - cardiovascular responses to exercise
    - respiratory responses to exercise

    - muscular responses to exercise
- Chronic Circulorespiratory Adaptations (long term effects) of exercise may be observed:
    - at rest
    - during submaximal exercise
    - during maximum exercise
- Chronic Muscular Adaptations (long term effects) of exercise as a result of:
    - endurance training
    - non-endurance (anaerobic and resistance) training

Minimum Work Requirements – Unit 1

Task	*Example Products*	*Criteria*
Task 1.1 Energy Systems Assignment (400–800 words or multi-modal equivalent)	1. In-class or online assessment 2. Review summary paper/presentation	1, 8
Task 1.2 LIP/ VO_2 Max Lab Report, including results and tables (1000 words)	1. Lab Report 2. Investigative Study (see 5.2)	1, 5, 7, 8
Task 1.3 Unit Summary Report (400–800 words or multi-modal equivalent)	End of unit reflection and review	1, 5 and 6 (if two Units have been covered)

UNIT 2: EXERCISE PHYSIOLOGY B
Topics

2.1 Training Programs
2.2 Recovery

2.1 Training Programs

- Components of fitness (such as flexibility, aerobic capacity and muscle strength):
    - major categories and application
- The Training Session:
    - warm-up
        - purposes and approaches
        - elements
        - physiological responses (refer acute training effects)
    - conditioning
    - skill development
    - cool-down
        - purpose
        - techniques
        - physiological responses (refer to recovery)
- Principles:
    - specificity
    - progressive overload
    - frequency
    - intensity
    - duration
    - de-training
    - variety
    - individuality
    - diminishing returns
- Methods – a number of key methods underpin all types of training program:
    - FITT formula (Frequency, Intensity, Time and Type)
    - continuous

        - LISS (Low Intensity Steady State)/Long Slow Distance training
        - lactate threshold training/MAS (Maximum Aerobic Speed)
        - fartlek
    - interval: (key variables and applications)
        - work interval
        - recovery interval
        - sets
        - repetitions
    - resistance
        - isotonic weight training
        - isometric resistance training
        - resistance models,for example, but not limited to: bodyweight, pilates, machines/cables/bands, supersets, dropsets, etc…
        - exercise ball (fit ball) training
        - resistance training key terms – repetition, set and repetition maximum
        - discussion – common principles and variables – manipulating volume/reps/sets
    - plyometric
        - principles
        - safety considerations
    - flexibility
        - dynamic
        - proprioceptive neuromuscular facilitation
        - static
    - circuit
        - aims and advantages
        - methods
    - cross training
        - aims and advantages
        - methods

  Trend towards application and design of various emerging or popular methods (such as cross fit, boxercise, HITT, tabata, trx, etc.) and their links to general categories.

- The Training Year:
    - Periodisation
        - preparatory pre-season (general preparation and specific preparation)
        - competitive phases/in-season (pre-competitive and competitive)
        - transition/off-season
    - Tapering and Peaking

2.2 Recovery

- Physiological causes of fatigue, concept of rest days, overtraining
- Recovery Strategies:
    - cool down (exercise or active recovery)
    - stretching
    - passive recovery
    - rehydration
    - commonly used techniques (including but not limited to)
        - cold-water immersion (CWI)/cryotherapy
        - contrast water therapy (CWT)
        - hot-water immersion (HWI)
        - massage
        - compression
        - low intensity pool sessions
- Role of the O_2 transport system in recovery (EPOC) and O_2 Debt:
    - Alactacid Debt – replenishment of ATP and PC Stores, O_2 resaturation of myoglobin and haemoglobin
    - Lactacid Debt – removal of Lactic Acid (includes fate or removal)
- Nutritional Replenishment:
    - consumption of CHO: suggested time frame
    - consumption of Protein: suggested time frame
    - muscle glycogen replenishment
    - rehydration: fluids & electrolytes

- Delayed Onset Muscle Soreness (DOMS)
    - characteristics
    - actions for minimizing impact/prevention

Minimum Work Requirements – Unit 2

Task	*Example Products*	*Criteria*
Task 2.1 Training Review (400–800 words)	1. Produce a table or graphic that compares common training methods by matching them to adaptation focus areas 2. Students participate in a training session and identify relevant training methods and link with fitness components 3. Planning a training session applying the theory relating to the training year, training principles and methods	2, 6, 7, 8
Task 2.2 Lab Report, including results and tables (1000 words)	1. Comparison of Heart Rate during 4 different workout regimes 2. Influence of post-exercise recovery techniques on recovery heart rate 3. Relationship of fatigue and recovery 4. The relationship between recovery time and performance using the ATP/CP system 5. Investigative Study	2, 5, 7, 8
Task 2.3 Unit Summary Report (400–800 words or multi-modal equivalent)	End of Unit reflection and review	2, 5 and 6 (if two Units have been covered)

UNIT 3: SKILL ACQUISITION
Topics

3.1 Motor Skills
3.2 Practicing Skills
3.3 Information Processing (Input, Processing, Output, Feedback)
3.4 Reaction Time and Decision Making
3.5 Memory
3.6 Feedback
3.7 Movement Analysis

3.1 Motor Skills

- Motor Skills:
    - motor programs
    - subroutines
- Classifying motor skills:
    - movement precision
        - fine
        - gross
    - type of movement
        - discrete
        - continuous
        - serial
    - environmental predictability
        - open
        - closed
    - concept of classification along a continuum
- Fitts and Posner Model for Stages of Skill Learning – cognitive, associative and autonomous:
    - characteristics for each stage

    - key points for instructional (coaches) support
    - Skill Learning Continuum
- Factors affecting skill acquisition – discussion to include, but not limited to:
    - age and maturity
    - gender
    - heredity
    - motivation
    - quality of instruction

3.2 Practicing Skills

- Classification of Practice Types:
    - massed practice and distributed practice
    - whole practice and part practice
    - fixed/drill practice and varied practice (including problem solving and game sense approach)
- Schema development (Schema theory Schmidt 1975) in the role of Varied Practice:
    - aligning choice of practice type to learner and skill scenarios

3.3 Information Processing (Input, Processing, Output, Feedback)

- Basic outline and application of the learning process – Information Processing Model:
    - sensory input
    - processing
        - stimulus identification
        - response selection
        - response programming
        - mental and neural fatigue
    - output (movement)
    - feedback
- Receiving Information (Sensory Input):
    - cues
    - senses
        - vision
        - equilibrium (balance)
        - proprioception (kinesthesis and touch)
        - hearing
    - signal detection
    - orienting
    - selective attention
        - how a coach can help to improve a player's selective attention

3.4 Reaction Time and Decision Making

- Reaction Time, Movement Time, Response Time:
    - importance
    - types of reaction time
        - simple RT
        - choice RT (Hick's Law)
- Factors Influencing Reaction Time:
    - number of stimulus-response alternatives (Choice RT)
    - age
    - gender
    - intensity of the stimulus
    - the probability of the stimulus occurring
    - the presence or absence of warning signals
    - signal detection
    - previous experience
    - selective attention
    - Psychological Refractory Period (successive presentation of cues)
    - stimulus-response compatibility
    - mental fatigue
- Reducing Reaction Time:
    - practice and the effect on choice RT

        - anticipation
            - spatial (or event) anticipation
            - temporal anticipation
            - benefits of anticipation

3.5 Memory

- Memory Capacity:
    - short term sensory storage
    - short term memory
    - long term memory
- Short-term sensory store
- Short-term memory (influence of selective attention)
- Factors that affect short-term memory:
    - relevance & meaningfulness
    - interference (distractions)
    - chunking or coding
    - rehearsal or practice
    - overloading
- Long-term memory:
    - muscle memory
- Application of memory to learning and refining sporting skills:
    - Schema

3.6 Feedback

- Main roles of Feedback:
    - motivate
    - reinforcement
    - regulate or change the performance – during activity
    - inform and improve future performance – post activity
- Sources of Feedback:
    - internal/intrinsic (sensory: vision, audition, touch, proprioception, forces, smell)
    - external/extrinsic (augmented)
- Nature of Feedback:
    - knowledge of performance (KP)
    - knowledge of results (KR)
- Timing of the Feedback:
    - continuous (concurrent)
    - terminal (discrete)

3.7 Movement Analysis
It is recommended that relevant aspects of the theory of movement analysis described below be delivered in conjunction with Study One of Unit 5: Scientific Investigative Methodologies.

- Introduction to Biomechanics:
    - biomechanical concepts and their application in sport science
    - understanding and use of common anatomical terms, e.g. flexion, abduction, anterior, etc...
- Kinematics: studies the description of motion:
    - Velocity
    - Motion
        - linear
        - angular
        - general
    - Projectile Motion
    - Factors affecting projectile motion
        - velocity of release
        - angle of release
        - height of release
        - shape
        - air resistance/friction
        - spin
- Kinetics: studies influences on the movement of a body:
    - mass and momentum
    - force – Newton's Laws of Motion 1, 2 ($F = ma$) and 3

    - levers
    - balance
        - base of support
        - centre of gravity
        - stability
    - sporting examples – discuss key situations where each of the biomechanical principles are prominent
- Principles of the Application of Biomechanical Knowledge – according to Amezdroz, Dickens, Hosford, Stewart and Davis (2010), *Queensland Senior Physical Education*, 3rd Ed. Australia, Macmillan Education Australia:
    - using observation (naked eye and video analysis) techniques
    - determine the objective of the skill
    - divide the skill into skill phases (key subroutines)
    - identify the movement patterns involved
    - identifying starter mechanisms
    - detecting errors: application of the biomechanical principles (kinematics and kinetics) listed above

Minimum Work Requirements – Unit 3

Task	*Example Products*	*Criteria*
Task 3.1 Lab Report, including results and tables (1000 words)	1. Classification of motor skills 2. Receiving Information (input) 3. Practice types and classification 4. Reaction time, movements time or response time tests>br>5. Factors affecting reaction time test 6. How memory impacts performance 7. Classification of feedback	3, 5, 7, 8
Task 3.2 Investigative Study (2000–4000 words or equivalent)	Refer to compulsory Task 5.1	3, 5, 7, 8
Task 3.3 Unit Summary Report (400–800 words or multi-modal equivalent)	End of Unit reflection and review	3, 5 and 6 (if two Units have been covered)

UNIT 4: SPORT PSYCHOLOGY
Topics

4.1 Self-Confidence in Sport and Exercise
4.2 Goal Setting
4.3 Preparation for Competition
4.4 Motivation
4.5 Arousal/Stress and Anxiety
4.6 Concentration
4.7 Visualisation

4.1 Self-Confidence in Sport and Exercise

- Self Confidence:
    - definition
- Self-efficacy in Sport and Exercise (task specific self-confidence):
    - value/importance
    - high self-efficacy traits
    - low self-efficacy traits
    - the relationship between self-efficacy and sport performance, i.e. overconfidence
- Four main antecedents of self-efficacy
  Bandura (1977, Psychological Review, Vol 84(2), 1921–215)
  (key variables that influence the level and strength of self-efficacy)

    - performance accomplishments
    - vicarious experiences (also called modelling)
    - verbal persuasion
    - physiological states

4.2 Goal Setting

- Types of Goals:
    - process
    - performance
    - outcome
    - short and long term
    - the Staircase/Stepping Stone model of short and long term goals
- Benefits of Goal Setting:
    - goals enhance focus and concentration
    - goals boost self-confidence
    - goals help create a positive mental attitude
    - goals increase intrinsic motivation to excel
    - goals improve the quality of practices by making training more challenging
    - goals enhance playing skill, techniques and strategies
    - goals improve overall performance
- Guidelines for goal setting – SMARTER:
    - specific
    - measurable
    - achievable or action-oriented or agreed or accepted
    - realistic
    - time-framed or phased
    - evaluate or exciting
    - recorded or reviewed

4.3 Preparation for Competition

- Pre-competition Strategies:
    - Lead up to event
        - rest
        - diet
        - equipment check
        - spare time
        - travel plans
        - mental preparation
    - At the competition venue
        - arrival time
        - who to report to
        - physical preparation
        - mental preparation
        - dressing for the contest
        - team meetings/individual discussion with the coach
        - who to spend time with
        - final personal preparation
- Competition Strategies:
    - your personal/team's game plan
    - key statistics/performance reference points/checks
    - monitoring KPIs/task relevant factors
    - mood/cue words
- Coping Strategies:
    - explanation and purpose – secondary plans
    - what ifs?
    - preparation to improve an athlete's ability to cope
        - managing pain and/or physical discomfort
        - a hostile crowd
        - discuss other scenarios, e.g. missed bus, equipment failure, violent team mate, media, etc...
- Debriefing:
    - guidelines for debriefing
        - as soon after the performance as possible
        - involve the athlete
        - identify positive and negative aspects of performance, i.e. what went right/wrong?

        - identify performance factors which were omitted

4.4 Motivation

- Explanation
- Self Determination Theory
- Types of Motivation:
    - positive
    - negative
    - intrinsic
    - extrinsic – tangible and intangible rewards
    - amotivation
- Motivational Techniques for Coaches and Athletes – may include, but is not limited to:
    - goal setting
    - using extrinsic rewards
    - motivational music
    - positive self-talk

4.5 Arousal/Stress and Anxiety

- Stress – sources of stress (stressors)
- The Influence of Arousal on Sporting Performance
    - arousal
    - Yerkes and Dodson's Inverted-U Hypothesis
    - relationship affected by the
        - individual athlete (personality, experience, etc...)
        - type of skill or sport: fine/gross, simple/complex
    - Catastrophe Theory
- Anxiety:
    - competitive anxiety
    - state anxiety
    - trait anxiety
    - choking
- Symptoms of Anxiety:
    - psychological (behavioural changes, emotional responses and cognitive functioning)
    - physiological changes (somatic)
- Techniques to Control Arousal Levels:
    - to raise arousal levels
    - to lower arousal levels (includes identifying various relaxation techniques)
    - coach vs self-regulation

4.6 Concentration

- Concentration and Attention
- Robert Nideffer's attentional dimensions (Reference: Nideffer, R.M. 1976, 'Test of attentional and interpersonal style', Journal of personality and Social Psychology, 34, 394–404):
    - width (broad and narrow) and direction (internal and external) dimensions
    - four types of attention
        - broad external
        - narrow external
        - broad internal
        - narrow internal
    - advantages, disadvantages and sporting applications of each attentional style
- Causes of Attentional Errors:
    - attentional mismatch (due to dominant attentional style) under stressful conditions which may be inappropriate
    - inability to adopt or maintain appropriate attentional focus
    - internal and external overloads
    - involuntary internal narrowing
- Flow State

4.7 Visualisation

- What is Visualisation – according to Syer, J and Connolly, C. (1998), '*Sporting Body, Sporting Mind: An athlete's guide to mental training*', London, Simon and Schuster:
    - why visualise?
    - senses involved in
        - seeing/visual
        - hearing/auditory
        - touch/feeling/kinaesthetic
- Using Visualisation:
    - mental rehearsal is the process of imagining yourself performing a specific movement or skill
    - mental rehearsal techniques
        - performance practice
        - instant preplay
        - instant replay
        - during performance
        - performance review
        - problem solving
    - using visualisation to
        - aid concentration
        - reduce anxiety and physical tension
        - suggest possible course of action
- Guidelines to Improve the Quality and Effectiveness of the Exercise (mental rehearsal):
    - start with a relaxation
    - stay alert
    - use the present tense
    - set realistic goals
    - set specific goals
    - use all your senses
    - visualise from the inside out and from the outside in
    - visualise at the correct speed
    - practice regularly, etc…

Minimum Work Requirements – Unit 4

Task	***Example Products***	***Criteria***
Task 4.1 Sport Psychology Task (800–1200 words)	1. Goal Setting in sport tasks: students set individual SMARTER goals and analyse the benefits of doing so 2. Design pre-competition, competing and coping strategies for a sport of choice 3. Investigating reasons why people play sport i.e what motivates them 4. Group brainstorm session followed by individual report 5. Sport psychology skills for travelling 6. Flyer/Handout 7. Sport psychology case studies	4, 6 (if possible), 7, 8
Task 4.2 Lab Report, including results with graphs/tables (1000 words)	1. Self-efficacy in sport Likert Scale 2. Investigating what motivates people to play sport 3. Application of the Inverted-U hypothesis or Catastrophe Theory 5. The Test of Attention and Interpersonal Style (TAIS) 6. Looking at the effectiveness of the different types of visualisation 7. Investigative study	4, 5, 7, 8
Task 4.3 Unit Summary Report (400–800 words or multi-modal equivalent)	End of Unit reflection and review	4, 5 and 6 (if two Units have been covered)

UNIT 5: SCIENTIFIC INVESTIGATIVE METHODOLOGIES AND SKILLS (20 Hours Suggested Time)
This Unit develops learners understanding of scientific investigative methodologies and skills within the context of a detailed study of two topics drawn from Units 1–4.

Students **will** undertake TWO (2) studies:

- one (1) study **will be** a movement analysis (Unit 3)
- one (1) study is **selected** from a topic chosen from Unit 1 ***OR*** Unit 2 ***OR*** Unit 4.

Within the given requirements and guidelines there is flexibility to select specific topics/focuses for each study.

These studies are scientific research involving humans. They must take full account of relevant principles and guidelines related to ethical conduct in human research.

> *All human interaction, including the interaction involved in human research, has ethical dimensions. However, 'ethical conduct' is more than simply doing the right thing. It involves acting in the right spirit, out of an abiding respect and concern for one's fellow creatures. This National Statement on 'ethical conduct in human research' is therefore oriented to something more fundamental than ethical 'do's' and 'don'ts' – namely, an ethos that should permeate the way those engaged in human research approach all that they do in their research.*
>
> *Human research is research conducted with or about people, or their data or tissue. It has contributed enormously to human good. Much human research carries little risk and in Australia the vast majority of human research has been carried out in a safe and ethically responsible manner. But human research can involve significant risks and it is possible for things to go wrong. Sometimes risks are realised despite the best of intentions and care in planning and practice. Sometimes they are realised because of technical error or ethical insensitivity, neglect or disregard.* https://www.nhmrc.gov.au/book/preamble https://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research. (accessed 7 Sept 2016)

Where the specific topic/focus for the study is selected by the teacher, the teacher – on behalf of the provider – will record the relevant ethical conduct in human research principles and guidelines, and the actions taken to address them.

Note: If specific topics/focuses for both studies are selected by the teacher, opportunities must be provided for learners to demonstrate their achievement on Criterion 7, Element 4.

Where the specific topic/focus for the study is selected by the learner/s, the learner/s must gain approval from the teacher – on behalf of the provider – prior to undertaking the study. Records will be made of the relevant ethical conduct in human research principles and guidelines, the actions taken to address these principals and guidelines, and the teacher's approval (or rejection) of the proposed study.

Useful resources on principles and guidelines related to ethical conduct in human research include:

- *National Statement on Ethical Conduct in Human Research 2007* (updated May 2015) https://www.nhmrc.gov.au/book/national-statement-ethical-conduct-human-research
- UTAS '*About Human Research Ethics*' webpage http://www.utas.edu.au/research-admin/research-integrity-and-ethics-unit-rieu/human-ethics/about-human-research-ethics (accessed 7 Sept 2016)

5.1 Movement Analysis (COMPULSORY)
It is recommended that the delivery of aspects of Unit 3.7 'Movement Analysis' (sections 'kinematics' and 'kinetics') relevant to the specific topic/focus of the study be undertaken in conjunction with this study.

NOTES:

1. The nature/scope of the movement that is analysed is **not** prescribed. The movement may be a simple one, or one involving a particular part of the human body, e.g. a wrist action in a hitting or bowling sport, a knee movement or leg action in a kicking sport. Highly complex, whole of body movements (such as the body when swimming or triple-jumping) may be studied depending on availability of resources.
2. The analysis will be limited to a 2-Dimensional analysis of a movement/set of movements that are easily observed in a single plane.

Learners may work in groups to gather data, but are required to **individually** complete and submit a written study. Learners may wish to present some or all of their work in an electronic format which aligns to the work requirements outlined below. The research topic and methodology employed in the Movement Analysis study will take full account of relevant principles and guidelines related to ethical conduct in human research.

Minimum Work Requirements – Unit 5.1
The written product for the Movement Analysis study **MUST** contain and address the following topics:

- Aim/Hypothesis
- Background Research and Ethical Considerations (1000 words submitted electronically)
- Method (equipment list, procedure, etc…)
- Results (including supporting tables, graphs, graphics, etc…, all clearly labelled)
- Discussion (1000–2000 words or equivalent)
- Conclusions and Recommendations
- References (citation) and a reference list/bibliography.

The research methodology for the Movement Analysis study will be guided by the principles of A*pplication of Biomechanical Knowledge* (according to Amezdroz, Dickens, Hosford, Stewart and Davis (2010), Queensland Senior Physical Education, 3rd Ed. Australia, Macmillan Education Australia):

- determine the objective of the skill
- using observation (naked eye and video analysis) techniques
- identify the movement patterns involved
- divide the skill into skill phases (key subroutines)
- detecting errors: application of the biomechanical principles (kinematics and kinetics) listed above
- identifying starter mechanisms.

The research will involve the use of video and computers to run video analysis software. Students will need some background support learning to develop their skills in the application of Movement Analysis ICT tools:

- guidelines (procedures) which should be followed for obtaining good video footage
- ICT: application of video analysis software, and its analysis.

The assessment for the Movement Analysis study is based on the degree to which a student can:

- Criterion 3 – analyse and discuss principles of skill acquisition in sport
- Criterion 5 – analyse and interpret sport science data and information
- Criterion 7 – access, research and analyse information
- Criterion 8 – communicate information in a variety of forms.

5.2 Selected Investigative Study
The topic of this study can be selected from Unit 1, Unit 2 *OR* Unit 4.

The topic must have a direct relationship to course content from the selected Unit.

Learners may work in groups to gather data, but are required to individually complete and submit a written study.

The research topic and methodology employed in the selected study will take full account of relevant principles and guidelines related to ethical conduct in human research.

The assessment for the Selected Investigative Study is based on Criteria 5, 7 and 8, and either Criterion 1 *OR* 2 *OR* 4 (Depending on the Unit of study)
The degree to which a learner can:

Criterion 5 – analyse and interpret sport science data and information
Criterion 7 – access, research and analyse information
Criterion 8 – communicate information in a variety of forms

AND

Criterion 1 – describe and analyse physiological aspects of exercise

OR

Criterion 2 – analyse and explain physiological responses to training

OR

Criterion 4 – examine and discuss how sport psychology influences athletic performance.

Minimum Work Requirements – Unit 5.2
The Selected Investigative Study's written product **MUST** contain and address the following topics:

- Aim/Hypothesis
- Background Research and Ethical Considerations (1000+ words submitted electronically)
- Method (equipment list, procedure, etc…)
- Results (includes tables, graphs, etc…, all clearly labelled)
- Discussion (1000–2000 words)
- Conclusions and Recommendations
- References (citation) and a reference list/bibliography.

The completed product represents a significant scientific research and investigation and should comprise at least 8 pages and approximately 2000 - 4000 words in its written and graphic content.

RECOMMENDED REFERENCING SYSTEMS

- UTas Referencing Practices (current 2106)
- Human Movement – APA
- Exercise and Health Sciences – Harvard

Work Requirements

Summary of Work Requirements

Unit	Example Product	Criteria
1	Task 1.1 Energy Systems Assignment (400-800 words or multi-modal equivalent) Task 1.2 lab and Report (e.g. LIP/ VO2 max) (1000 words) Task 1.3 Unit Summary Report (400-800 words or multi modal equivalent)	1, 8 1, 5, 7, 8 1, 5, 6
2	Task 2.1 Training Review (400-800 words) Task 2.2 Lab & Report (1000 words) Task 2.3 Unit Summary Report (400-800 words or multi modal equivalent)	2, 6, 7, 8 2, 5, 7, 8 2, 5, 6
3	Task 3.1 Lab & Report (1000 words) Task 3.2 Investigative Study (see Task 5.1) Task 3.3 Unit Summary Report (400-800 words or multi modal equivalent)	3, 7, 8 3, 5, 7, 8 3, 5, 6
4	Task 4.1 Sport Psychology Task (800-1200 words) Task 4.2 Lab & Report (1000 words) Task 4.3 Unit Summary Report (400-800 words or multi modal equivalent)	4, 6, 7, 8 4, 5, 7, 8 4, 5, 6
5	5.1 Movement Analysis (2000-4000 words or multi-modal equivalent) 5.2 Selected Investigative Study (2000-4000 words or multi-modal equivalent)	3, 5, 7, 8 1, 2, 4 , 5, 7, 8

In keeping with the nature of this field of study, teachers and learners are encouraged to integrate technology to assist in their work practices. Tools like email, turnitin (http://turnitin.com/) and VLEs can fill a useful role in managing drafts, building communication, monitoring progress and storing assessment items.

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course. Therefore, assessment for summative reporting to TASC will focus on what both teacher and learner understand to reflect end-point achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Providers offering this course must participate in quality assurance processes specified by TASC to ensure provider validity and comparability of standards across all awards. Further information on quality assurance and assessment processes.

Internal assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to TASC.

TASC will supervise the external assessment of designated criteria which will be indicated by an asterisk (*). The ratings obtained from the external assessments will be used in addition to internal ratings from the provider to determine the final award.

Quality Assurance Process

The following processes will be facilitated by TASC to ensure there is:

- a match between the standards of achievement specified in the course and the skills and knowledge demonstrated by learners
- community confidence in the integrity and meaning of the qualification.

Process: TASC gives course providers feedback about any systematic differences in the relationship of their internal and external assessments and, where appropriate, seeks further evidence through audit and requires corrective action in the future.

External Assessment Requirements

The external assessment for this course will comprise a three-hour (3 hours) written examination which assesses Criteria 1, 2, 3, 4, 5 and 6.

For further information, see external assessment specifications and guidelines.

Criteria

The assessment for Sport Science Level 3 will be based on the degree to which the learner can:

1. describe and analyse physiological aspects of exercise*
2. analyse and explain physiological responses to training and recovery*
3. analyse and discuss concepts of skill acquisition in sport*
4. examine and discuss how sport psychology influences athletic performance*
5. analyse and interpret sport science data and information*
6. examine and discuss cross-discipline links*
7. access, research and analyse information
8. communicate information in a variety of forms

Note: * denotes criteria that are both externally and internally assessed

Standards

Criterion 1: describe and analyse physiological aspects of exercise

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
correctly uses specialised terminology when discussing physiological aspects of exercise, and connects and explains physiological terms related to exercise	correctly uses terminology when discussing physiological aspects of exercise, and correctly explains physiological terms related to exercise	correctly uses basic terminology when discussing physiological aspects of exercise, and correctly defines common physiological terms related to exercise
connects and explains concepts related to physiological aspects of exercise with accuracy and clarity	accurately describes concepts related to physiological aspects of exercise	describes concepts related to physiological aspects of exercise
analyses and evaluates similarities, differences and relationships between both distinctive and closely related physiological concepts and systems of exercise	analyse the similarities, differences and relationships between both distinctive and closely related physiological concepts and systems of exercise	describes and explains the similarities, differences and relationships between distinctive physiological concepts and systems of exercise
evaluates and applies a wide range of relevant exercise physiology principles to recommend actions and interventions for a variety of training and competition scenarios	analyses, relates and applies a range of relevant exercise physiology principles to recommend actions and interventions for given training and competition scenarios	explains and applies relevant exercise physiology principles to recommend actions and interventions for given training and competition scenarios
uses a wide range of relevant evidence and/or examples to support their discussion of physiological aspects of exercise	selects and uses a range of relevant evidence and/or examples to support their discussion of physiological aspects of exercise	uses relevant evidence and/or examples to illustrate their discussion of physiological aspects of exercise

Criterion 2: analyse and explain physiological responses to training and recovery

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
uses physiological profiles and responses to identify and classify relevant factors, and proposes and justifies suggested training modifications	uses physiological profiles and responses to identify relevant factors and explain suggested training modifications	uses physiological profiles and responses to identify critical issues and suggest fundamental training modifications
differentiates and justifies appropriate training program approaches by evaluating and comparing their focus and intended physiological adaptations	differentiates and justifies appropriate training program approaches by analysing and comparing their focus and intended physiological adaptations	differentiates some training program approaches by explaining and comparing their focus and intended physiological adaptations
analyses, selects and explains appropriate training programs and strategies for specific sports and athletes	selects and explains appropriate training programs and strategies for specific sports and athletes	explains appropriate training programs and strategies for specific sports and athletes
evaluates physiological responses to training and recovery and provides	analyses physiological responses to training and recovery and provides	reviews physiological responses to training and recovery and provides

appropriate explanations and specific recommendations	appropriate explanations and general recommendations	general observations and recommendations
evaluates and compares a range of programs used to balance athlete workload and recovery	analyse and compares a range of contemporary programs used to balance athlete workload and recovery	explains and compares a range of contemporary programs used to balance athlete workload and recovery
evaluates, creates and justifies training plans reflecting fundamentals in training program design	analyses, creates and justifies training plans reflecting fundamentals in training program design	assesses, creates and justifies training plans reflecting fundamentals in training program design

Criterion 3: analyse and discuss concepts of skill acquisition in sport

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
correctly uses specialised terminology when discussing skill acquisition, and accurately defines and classifies terms related to skill acquisition	correctly uses terminology when discussing skill acquisition, and correctly defines and explains terms related to skill acquisition	correctly uses basic terminology when discussing skill acquisition, and correctly defines common terms related to skill acquisition
compares, relates and critically analyses principles related to skill acquisition with accuracy and clarity	compares, relates and analyses principles related to skill acquisition	describes and explains principles related to skill acquisition
compare, relate and critically analyses similarities, differences and relationships between both distinctive and closely related principles of skill acquisition	compares, relates and analyses similarities, differences and relationships between both distinctive and closely related principles of skill acquisition	describes and explain similarities, differences and relationships between distinctive principles of skill acquisition
critically analyse a wide range of scenarios to identify and explain relevant skill acquisition principles	analyse a range of scenarios to identify and explain relevant skill acquisition principles	explains how to apply a range of relevant skill acquisition principles to given scenarios
evaluates a wide range of relevant evidence and examples to support their discussion of skill acquisition	selects and analyses relevant evidence and examples to support their discussion of skill acquisition	selects relevant evidence and examples to support discussion of skill acquisition
evaluates and connects specific observations in gross and subtle movement elements when comparing novice and expert performers	analyses and discusses key observations in gross and subtle movement elements when comparing novice and expert performers	explains and discusses broad general observations and gross movement elements when comparing novice and expert performers
analyses and prioritises suggested adjustments to movement elements gathered using biomechanics and skill analysis software	diagnoses and suggests improvements to movement elements gathered using biomechanics and skill analysis software	identifies and describes basic movement elements gathered using biomechanics and skill analysis software

Criterion 4: examine and discuss how sport psychology influences athletic performance

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C

correctly uses specialised terminology when discussing sport psychology, and accurately defines and connects terms related to sport psychology	correctly uses terminology when discussing sport psychology, and correctly defines and relates terms related to sport psychology	correctly uses basic terminology when discussing sport psychology, and correctly defines common terms related to sport psychology
evaluates how sport psychology can impact performance	analyses how sport psychology can impact performance	describes and explains how sport psychology can impact performance
analyses the similarities, differences and relationships between distinctive and closely related principles of sport psychology	compares the similarities, differences and relationships between distinctive and closely related principles of sport psychology	describes similarities, differences and relationships between distinctive principles of sport psychology
connects relevant sport psychology concepts and ideas to performance in a wide range of sporting contexts	connects relevant sport psychology concepts and ideas to performance across a range of sporting contexts	connects relevant sport psychology concepts and ideas to performance in a limited range of sporting contexts
evaluates a range of relevant sporting examples to support their illustrations of sport psychology concepts	select and analyses relevant sporting examples to support their illustrations of sport psychology concepts	select relevant examples to support their illustrations of sport psychology concepts

Criterion 5: analyse and interpret sport science data and information

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
identifies and critically analyses trends, relationships* and anomalies in sport science data and information	identifies and analyses trends and relationships* that exists in sport science data and information	identifies trends and relationships* that exist in sport science data and information
critically analyses and interprets sport science related data and information to make clear, logical and considered predictions	analyses sport science related data and information to make reasoned predictions	makes valid predictions based on data and information
fluently incorporates use of accurate and relevant data/information to justifies a response or argument	fluently incorporates use of relevant data/information in support of a response or argument	incorporates use of data/information in support of a response or argument
draws reasoned and logical conclusions and makes recommendations based on analysis and interpretation of data	draws valid conclusions, and makes logical connections based on interpretation of data	draws valid, basic conclusions based on interpretation of data
correctly operates, calibrates and compares a variety of testing apparatus used to measure, and accurately record data	correctly operates and calibrates a variety of testing apparatus used to measure, and accurately record data	correctly operates a variety of testing apparatus used to measure, and record data

*'*Relationships*' involves comparisons/contrasts, similarities/differences.

Criterion 6: examine and discuss cross-discipline links

This criterion is both internally and externally assessed.

With reference to two of the following discipline areas:

- Exercise Physiology*,
- Skill Acquisition, or
- Sports Psychology,

the learner:

Rating A	Rating B	Rating C
correctly identifies a wide range of cross-discipline links from various sporting scenarios	correctly identifies a range of cross-discipline links from various sporting scenarios	correctly identifies key cross-discipline links from various sporting scenarios
correctly uses specialised terminology when discussing a wide range of cross-discipline links	correctly uses terminology when discussing a range of cross-discipline links	correctly uses basic terminology when discussing cross-discipline links
evaluates relevant cause and effect connections across multiple discipline areas and their effect on sport performance	analyses relevant cause and effect connections across multiple discipline areas and their effect on sport performance	explains relevant cause and effect connections across multiple discipline areas and their effect on sport performance
accurately describes, explains and analyses how aspects in one area might influence sporting performance in another area. The response is logical and valid, and contains accurate explanation regarding how/why this might be so.	accurately describes and explains how aspects in one area might influence sporting performance in another area. The response is valid and contains some specific detail explaining how/why this might be so.	describes how aspects in one area might influence sporting performance in another area. The response is generally valid and is described in broad, general terms.
chooses and compares a range of relevant sporting examples to support their illustrations when discussing cross-discipline links	chooses and explains relevant sporting examples to support their illustrations when discussing cross-discipline links	chooses relevant examples to support their illustrations when discussing cross-discipline links

*The discipline area encompassed by Exercise Physiology refers to the combined content from both Unit 1 and Unit 2 in this course.

Criterion 7: access, research and analyse information

The learner:

Rating A	Rating B	Rating C
critically analyses sources, selects accurate and relevant information, and correctly extracts detailed meaning to form a reasoned response and reach valid, logical conclusions about sport science issues	analyses sources and selects relevant information, and correctly extracts meaning to form a considered response and reach valid conclusions about sport science issues	selects information and correctly extracts basic meaning to form a response and reach valid conclusions about sport science issues
chooses, justifies and applies scientific investigative methodologies appropriate to a specific study	chooses and applies general scientific investigative methodologies to a specific study	applies general scientific investigative methodologies as directed
critically evaluates the accuracy, scope and validity of information collected, and – when appropriate – analyses it in the light of similar studies undertaken by others	assesses the accuracy and scope of information collected	makes valid observations regarding the accuracy and scope of the information collected
identifies relevant principles and guidelines of ethical conduct related to a human research study, and proposes effective actions to address these	identifies relevant principles and guidelines of ethical conduct related to a human research study, and proposes actions to address these principles and guidelines	identifies relevant principles and guidelines of ethical conduct related to a human research study

effectively uses suitable online search tools and selectively evaluates information from multiple sources for validity, currency, quality and relevance	effectively uses suitable online search tools and selectively filters information from multiple sources for currency, quality and relevance	effectively uses online search tools to collate and store information which is current and relevant

Criterion 8: communicate information in a variety of forms

The learner:

Rating A	Rating B	Rating C
clearly and accurately conveys ideas and information using appropriate formats*	clearly conveys ideas and information using appropriate formats*	conveys ideas and basic information using appropriate formats*
produces written work for a wide range of contexts in which English usage is correct, e.g. correct grammar, spelling of technical/specialised terms, punctuation, complex sentence structure, and effective use of paragraphs	produces written work for a range of contexts in which English usage is correct, e.g. correct grammar, spelling, punctuation, sentence structure, and use of paragraphs	produces written work in which basic English usage is correct, e.g. correct grammar, spelling of common words, simple punctuation, sentence structure, and use of paragraphs
creates appropriate and clear graphs and tables to communicate complex sport science data/information	creates appropriate and clear graphs and tables to communicate sport science data/information	creates simple graphs and tables to communicate sport science data/information
creates complex reports and papers using appropriate formatting conventions, e.g. scientific report, laboratory report, research paper. Reports are clearly and correctly structured, e.g. introduction, methods, results, discussion, references/citation.	creates reports and papers using appropriate formatting conventions, e.g. scientific report, laboratory report, research paper. Reports follow required structure, e.g. introduction, methods, results, discussion, references/citation.	creates simple reports and papers using formatting conventions, e.g. scientific report, laboratory report, research paper, as directed. Reports generally follow required structure, e.g. introduction, methods, results, discussion, references/citation.
clearly identifies sources of the information, images, ideas and words that are not the learner's own	clearly identifies sources of the information, images, ideas and words that are not the learner's own	identifies the sources of information, images, ideas and words that are not the learner's own
referencing conventions and methodologies are followed with a high degree of accuracy	referencing conventions and methodologies are followed correctly	referencing conventions and methodologies are generally followed correctly
creates appropriate, well structured reference lists/bibliographies	creates appropriate, structured reference lists/bibliographies	creates appropriate reference lists/bibliographies

*'*Formats*' might include:

- using ICT and appropriate software to create a: PowerPoint visual; web-based multimedia or video presentation; website; blog; or Wiki
- creating a poster, brochure, or flyer
- giving a class talk or verbal presentation
- leading/undertaking other roles in a scientific investigation or practical activity
- written responses.

Qualifications Available

Sport Science Level 3 (with the award of):

EXCEPTIONAL ACHIEVEMENT (EA)
HIGH ACHIEVEMENT (HA)
COMMENDABLE ACHIEVEMENT (CA)
SATISFACTORY ACHIEVEMENT (SA)
PRELIMINARY ACHIEVEMENT (PA)

Award Requirements

The final award will be determined by Tasmanian Assessment, Standards and Certification from 14 ratings (8 from the internal assessment, 6 from external assessment).

The minimum requirements for an award Sport Science Level 3 are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)
12 'A' ratings, 2 'B' ratings (5 'A' ratings, 1 'B' rating from external assessment)

HIGH ACHIEVEMENT (HA)
6 'A' ratings, 6 'B' ratings, 2 'C' ratings (2 'A' ratings, 3 'B' ratings and 1 'C' rating from external assessment)

COMMENDABLE ACHIEVEMENT (CA)
8 'B' ratings, 5 'C' ratings (2 'B' ratings, 3 'C' ratings from external assessment)

SATISFACTORY ACHIEVEMENT (SA)
12 'C' ratings (4 'C' ratings from external assessment)

PRELIMINARY ACHIEVEMENT (PA)
7 'C' ratings

A student who otherwise achieves the ratings for a CA (Commendable Achievement) or SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

The Department of Education's Curriculum Services will develop and regularly revise the curriculum. This evaluation will be informed by the experience of the course's implementation, delivery and assessment.

In addition, stakeholders may request Curriculum Services to review a particular aspect of an accredited course.

Requests for amendments to an accredited course will be forward by Curriculum Services to the Office of TASC for formal consideration.

Such requests for amendment will be considered in terms of the likely improvements to the outcomes for learners, possible consequences for delivery and assessment of the course, and alignment with Australian Curriculum materials.

A course is formally analysed prior to the expiry of its accreditation as part of the process to develop specifications to guide the development of any replacement course.

Course Developer

The Department of Education acknowledges the significant leadership of Paul Jones (Rosny College), Melissa Brown (Guilford Young College), Sarah Hardy (Don College), Paul Smith (St. Patrick's College), and Darren Perry (Curriculum Teacher Leader – Health and Physical Education) in the development of this course.

Expectations Defined By National Standards In Content Statements Developed by ACARA

There are no content statements developed by ACARA that are relevant to this course.

Accreditation

The accreditation period for this course has been renewed from 1 January 2022 until 31 December 2025.

During the accreditation period required amendments can be considered via established processes.

Should outcomes of the Years 9-12 Review process find this course unsuitable for inclusion in the Tasmanian senior secondary curriculum, its accreditation may be cancelled. Any such cancellation would not occur during an academic year.

Version History

Version 1 – Accredited on 5 October 2017 for use from 1 January 2018. This course replaces SPT315113 Sport Science that expired on 31 December 2017.

Version 1.a – Minor clarification of work requirements 5.1 and 5.2 (re-word count) and addition of work requirements summary table (5 December 2017).

Accreditation renewed on 22 November 2018 for the period 1 January 2019 until 31 December 2021.

Version 2 - Amendment on 4 February 2019: changes to wording of Criterion 2 and 3, and minor changes to standard elements of Criterion 1, 2 & 6.

Version 2.a - Renewal of Accreditation on 14 July 2021 for the period 31 December 2021 until 31 December 2025, without amendments.

Appendix 1

GLOSSARY OF TERMS – SPORT AND EXERCISE SCIENCE

The purpose of the glossary is to guide and support teachers and learners with regard to terms and concepts that are likely to be encountered during the delivery of this course. It is NOT considered to be part of the course content and learners will not be examined on definitions of terms.

Acute Injury
A traumatic and intense injury that occurs all at once.

Aerobic
Requiring the presence of air or free oxygen to sustain life.

Aerobic Metabolism
Chemical process that the body uses to generate Adenosine Tri-Phosphate (ATP).

Anaerobic
Pertaining to or caused by the absence of oxygen.

Anaerobic Metabolism
Chemical process that the body used to generate ATP and it makes lactic acid.

Biomechanics
The study of the action of external and internal forces on the living body.

Blood Doping
A procedure in which an athlete is injected with his or her own previously drawn and stored red blood cells to increase the body's oxygen-carrying capacity before a competition.

Body Morphology
All of the parts that make up the human body physiologically.

Central Nervous System
Brain and spinal cord.

Chronic Injury
An injury that occurs over time.

Dietitian
A person who is an expert in nutrition or dietetics.

Exercise Adherence
Sticking to the exercise treatment program that was prescribed.

Exercise Metabolism
All of the chemical processes the body goes through during exercise.

Exercise Prescription
A prescription for the best exercise for an individual.

Exercise Psychology
The scientific study of people and their behaviours in sports and exercise contexts and the practical applications of that knowledge.

Exercise Response
The body's response to exercise.

Exercise Science
The study of human movement from anatomical or mechanical perspective or both.

Feedback
The return of part of the output of a circuit, system, or device to the input, either purposely or unintentionally.

Kinesiology
The study of the anatomy and physiology of body movement.

Lactic Acid
A syrupy liquid ($C_3H_6O_3$) produced by anaerobic metabolism.

Metabolism
The sum of the physical and chemical processes in an organism, by which its substance is produced, maintained and destroyed, and by which energy is made available.

Motor Control
Is the study of the neural, physical and behavioural aspects of movement.

Motor Development
Is the sequential, continuous age-related process whereby movement behaviour changes.

Motor Learning
Refers to the relatively permanent gains in motor skill capability associated with practice or experience.

Overload
Level of exercise within the body that is above what it experiences on a daily level.

Pedagogy
The art or method of teaching.

Peripheral Nervous System
All neural tissue outside the central nervous system.

Physical Growth
Is an increase in size or body mass resulting from an increase in complete, already formed body parts.

Progressive Overload
It gives the system enough stimuli to create a gradual change.

Recall Memory
A memory test that requires subjects to reproduce information on their own without any cues.

Recognition Memory
A memory test that requires subjects to select previously learned information from an array of options.

Sports Pedagogy
Promotes the educational research in physical education and youth sports and related fields such as teaching and coach education.

Reference: J Welch, *Exercise Science Glossary*

Appendix 2

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

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

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.

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

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.

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

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.

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

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

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.

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.

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

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

Sedentary behaviour
Activities that have a low energy requirement professional practice.

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

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.

REFERENCES

Exercise Science Standards – Australia

Other useful glossary resources (accessed Sept 2016):

http://www.metasport.com/sports-science-terminology/

http://www.topendsports.com/testing/glossary.htm

https://www.verywell.com/glossary-of-sports-medicine-terminology-a-3119188

http://positivesportparent.com/definitions-and-benefits-of-commonly-used-sports-related-terminology/

https://quizlet.com/119606607/sport-science-glossary-flash-cards/

Appendix 3

LINE OF SIGHT – Sport Science Level 3

Learning Outcomes	Units	Criteria and Elements
analyse and interpret theory supporting current practices in exercise physiology, skill acquisition, and sport psychology	1, 2, 3, 4, 5, 6, 7	C1 E1–5; C2 E2–6; C3 E1–7; C4 E1–5; C6 E1–5; C7 E1–5; C8 E1–2
differentiate and explain how exercise physiology, skill acquisition, and sport psychology, impact in isolation and combination to influence sporting performance	1, 2, 3, 4, 6, 8	C1 E2–5; C2 E1–6; C3 E2–7; C4 E2–5; C6 E1–5; C8 E1–7
utilise analytical and interpretive skills to solve problems and process data	1, 2, 3, 4, 5, 7	C1 E3–5; C2 E1, 4, 6; C3 E6–7; C4 E2–5; C5 E1–4; C7 E1
undertake scientific research activities and summarise ethical issues related to human research studies	5, 7, 8	C5 E1–5; C7 E1–5
identify, describe, recall facts, definitions, terminology and principles as they relate to various contexts through the study, observation of, and engagement in, physical activity	1, 2, 3, 4, 5, 8	C1 E2–5; C2 E1–6; C3 E1–7; C4 E1–5; C8 E1, 5–7
apply knowledge and understanding of exercise physiology, skill acquisition, and sport psychology to a variety of sporting contexts to develop appropriate strategies in order to maximise athlete performance	1, 2, 3, 4, 5, 6	C1 E4; C2 E1–6; C3 E2–7; C4 E1–5; C6 E1–5
select, interpret, analyse and manipulate information from a variety of sources	1, 2, 3, 4, 5, 7	C1 E3–5; C2 E1, 3–6; C3 E4–7; C4 E2–5; C5 E1–5; C7 E1, 3
identify solutions to problems or practical situations and scenarios in exercise physiology, skill acquisition, and sport psychology	1, 2, 3, 4, 5, 6, 8	C1 E4-5; C2 E1-6; C3 E4-7; C4 E3-5; C5 E4; C6 E1-5; C8 E1, 2, 4-7

Supporting documents including external assessment material

- SPT315118 Sport Science TASC Exam Paper 2018.pdf (2018-12-09 09:47am AEDT)
- SPT315118 - Assessment Panel Report 2018.pdf (2019-02-07 03:04pm AEDT)
- SPT315118 Sport Science TASC Exam Paper 2019.pdf (2019-11-21 11:15am AEDT)
- SPT315118 Assessment Report 2019.pdf (2020-02-03 09:29am AEDT)
- SPT315118 Sport Science Sample Questions July 2020.pdf (2020-07-20 04:34pm AEST)
- SPT315118 Sport Science TASC Exam Paper 2020.pdf (2020-11-13 09:33pm AEDT)
- SPT315118 Assessment Report 2020.pdf (2021-01-15 02:23pm AEDT)
- SPT315118 Sport Science TASC Exam Paper 2021.pdf (2022-01-14 09:11am AEDT)
- SPT315118 Assessment Report 2021.pdf (2022-01-24 03:23pm AEDT)
- SPT315118 Sport Science External Assessment Specifications.pdf (2022-04-07 03:44pm AEST)
- SPT315118 Sport Science TASC Exam Paper 2022.pdf (2022-11-18 05:27pm AEDT)

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