Sport Science

LEVEL 3	15 TCE CREDIT POINTS
COURSE CODE	SPT315113
COURSE SPAN	2013 — 2017
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	NO

This course was delivered in 2017. Use A-Z Courses to find the current version (if available).

Sport Science encompasses the physiological, psychological and skill acquisition components when planning and analysing human performance

This theoretical course has been designed to allow learners to develop their skills, knowledge and understanding of issues related to high level athletes training and performance. Learners are encouraged to undertake high-order thinking and are challenged to consider the complex inter-relationships between core areas of study and to complete scientific investigative studies.

Course Description

This course is designed for students who wish to expand their skills and understanding in Sport Science through a theoretical and applied understanding of the factors which influence sporting performance. Sport Science encompasses the physiological, psychological and skills acquisition components of analysing human performance. It is the study of athletes, how their bodies produce energy for physical activity, how they recover, the theory behind training programs and what it means physiologically to be fit. It looks at the motor skills and learning, the importance of reaction time and the study of biomechanics. Sport Science also involves studying the psychology of the athlete: how they can improve their performance through techniques such as setting goals, performance planning and being mindful of an athlete's mental focus to control anxiety levels.

The course encourages high-order thinking as learners are challenged to consider the complex inter-relationships between core areas of study and to complete scientific investigative studies.

Rationale

Sport Science encompasses the physiological, psychological and skill acquisition components when planning and analysing human performance. This theoretical course has been designed to allow students to develop their skills, knowledge and understanding of issues related to high level athletes training and performance.

Learners are encouraged to undertake high-order thinking and are challenged to consider the complex inter-relationships between core areas of study and to complete scientific investigative studies.

Learning Outcomes

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

1. understand the theory of exercise physiology, skill acquisition, and sport psychology
2. understand how exercise physiology, skill acquisition, and sport psychology interrelate to influence sporting performance
3. develop analytical and interpretive skills to solve problems and process data presented to them or collected during research
4. undertake scientific research activities and understand ethical issues related to human research studies
5. identify, describe, recall, and comprehend facts, definitions, terminology and principles as they relate to various contexts through the study, observation of, and engagement in, physical activity
6. apply knowledge and understanding of exercise physiology, skill acquisition, and sport psychology to a variety of sporting contexts
7. be able to select, interpret, analyse and manipulate information from a variety of sources
8. identify solutions to problems in exercise physiology, skill acquisition, and sport psychology.

Access

Providers of this course must ensure student access to video camera(s) and ICT tools for the movement analysis investigative study. Suitable packages – such as SkillSpector – are available without cost.

Learners are assumed to have basic knowledge and understanding of the body's respiratory, circulatory and muscular systems. Satisfactory completion of Sport Science – Foundation Level 2 or courses in the area of life sciences/biology would provide evidence of such knowledge and understanding.

Pathways

Sport Science has strong links to the Tasmanian Curriculum's Health and Wellbeing statement and standards.

Sport Science – Foundation Level 2 provides learners with a pathway to this Level 3 course.

This course provides a strong basis for students going on to further vocational and/or tertiary study including Health & Allied Health Careers, Human Movement, Exercise Science, Education, Health Science, Physiotherapy and other Sport Related Careers.

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 judgement 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.

Course Requirements

There are four (4) modules in this course. Students will undertake study of **ALL** modules and **ALL** topics/sub-topics. In Module 4 students will complete one **(1) compulsory** study and one **(1) selected** study from topics in Module 1 or 3.

Course Content

There are four (4) modules in this course:

- Module 1: Exercise Physiology
- Module 2: Skill Acquisition
- Module 3: Sport Psychology
- Module 4: Scientific Investigative Methodologies and Skills

While each of the modules 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 both the Module and topic level. For example, a provider may deliver a topic from Module 2 and make comparisons with a topic from Module 1. Interrelationships between Modules/topics will be studied throughout the year as links between them arise.

It is recommended that Modules 1, 2 and 3 are allocated approximately equal delivery time. Module topics/sub-topics may be delivered as purely theoretical studies or as studies contextualised within practical activities. See also the requirements for Module 4.

MODULE 1: EXERCISE PHYSIOLOGY

TOPICS

1.1 ENERGY & ENERGY SYSTEMS
1.2 OXYGEN DELIVERY
1.3 RECOVERY
1.4 EFFECTS OF TRAINING
1.5 TRAINING PROGRAMS

1.1 ENERGY & ENERGY SYSTEMS

- Energy
- Role of ATP
    - Structure
    - High energy bond
- Energy sources to replenish ATP (sources, storage & transportation)
    - Creatine Phosphate
    - Carbohydrates (low glycaemic index foods & high glycaemic foods)
    - Fats
    - Protein
        - Concept of “Hitting the wall”
        - Glycogen Sparing
- ATP Production
    - During resting conditions
    - During exercise
- Phosphagen (ATP – CP or Alactic System)
    - ATP Splitting
    - Basic equations (not including enzymes)
    - Characteristics:
        - metabolism (method of energy production)
        - fuel sources
        - speed of ATP production
        - quantity of ATP production (but 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 & Acidosis
    - Characteristics:
        - metabolism (method of energy production)
        - fuel sources

        - speed of ATP production
        - quantity of ATP production (but 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 & Electron Transport System (not including enzymes)
        - fate of the by-products (heat, water & carbon dioxide)
    - Glycolysis
    - Characteristics:
        - metabolism (method of energy production)
        - fuel sources
        - speed of ATP production
        - quantity of ATP production (but not a specific amount ie actual number)
        - 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 takes far greater energy demand much earlier than previously thought.
- Muscle Fibre Types: Slow (Type I) and Fast (Type IIa and Type IIb)
    - Characteristics.

1.2 OXYGEN DELIVERY

- Oxygen Deficit
- Aerobic Steady State
- VO2 & VO2 Max
    - Absolute & relative Vo2 max. (including making calculations)
    - In relation to athletes in different sports and fitness levels
    - In relation to fitness testing
    - Factors that affect an individual's VO2 max
        - aerobic fitness
        - body size
        - gender
        - heredity
        - age
- Lactate Threshold (Lactate Inflexion Point, Onset of Blood Lactate Accumulation)
    - Variability of Lactate Threshold as a percentage of VO2 maximum and maximum heart rate
    - Improving your lactate threshold
    - Buffering.

1.3 RECOVERY

- Physiological causes of fatigue, concept of rest days, overtraining
- Physiological Strategies:
    - Cool down (exercise or active recovery)
    - Stretching
    - Passive Recovery
    - Rehydration
    - Regenerative techniques (Neural strategies) identification of:
        - cold-water immersion (CWI)
        - contrast water therapy (CWT)
        - hot-water immersion (HWI)
        - massage

        - others
- Role of the O2 transport system in recovery (EPOC) and O2 Debt
    - Alactacid Debt: replenishment of ATP & PC Stores
    - Lactacid Debt: removal of Lactic Acid (includes fate or removal)
- Nutritional Replenishment
    - Consumption of CHO: suggested time frame
    - Muscle glycogen replenishment rates for continuous & intermittent activity
    - Rehydration: fluids & electrolytes
- Delayed onset muscle soreness (DOMS).

1.4 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 callisthenic) training.

1.5 TRAINING PROGRAMS

- Components of fitness (such as flexibility, aerobic capacity and muscle strength) *Knowledge of major categories/terms only is required*
- The Training Session
    - Warm-up
        - purpose
        - elements
        - physiological responses (effects) that occur
    - Conditioning/Skill Development
    - Cool-down
        - purpose
        - techniques
        - physiological effects
- Principles
    - Specificity
    - Progressive overload
    - Frequency
    - Intensity
    - Duration
    - Detraining
    - Variety
    - Diminishing returns
- Methods: Knowledge to allow identification of methods listed here only is required
    - Continuous
        - FITT formula (Frequency, Intensity, Time & Type)
        - long slow distance training
        - lactate threshold training
        - fartlek
    - Interval: Key variables
        - work interval
        - recovery interval
        - sets
        - repetitions
    - Resistance
        - isotonic weight training
        - isometric resistance training
        - resistance calisthenics
        - exercise ball (fit ball) training
    - Plyometrics
    - Flexibility
        - dynamic

        - proprioceptive neuromuscular facilitation
        - static
        - ballistic
    - Circuit
- The Training Year
    - Periodisation
        - transition
        - preparatory (general preparation & specific preparation)
        - competitive phases (pre-competitive and competitive)
    - Peaking
        - whole year peaking
        - in-season peaking
        - tapering.

INTERRELATIONSHIPS

The various topics and sub-topics noted above have limited meaning if they are treated discretely or in isolation.

Complex interrelationships also exist between Module 1's topics/sub-topics and those of Module 2 and Module 3.

Learners are required to identify and explain interrelationships between the topics/sub-topics studied in this Module (Exercise Physiology) and those studied in Module 2 (Skill Acquisition) and Module 3 (Sport Psychology). For example, athletes must be highly motivated (Sport Psychology) to implement recovery techniques after exercise (Exercise Physiology).

The study of such interrelationships 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 Modules.

The interrelationships between Modules' topics will be studied throughout the year as links between them arise. When studies of interrelationships will occur will depend on the provider's choices regarding the sequence of delivery of Modules and topics/sub-topics: it is not intended that the study of interrelationships be a discrete activity undertaken only after the delivery of all the Modules.

MODULE 2: SKILL ACQUISITION

TOPICS:

2.1 MOTOR SKILLS
2.2 PRACTICING SKILLS
2.3 INFORMATION PROCESSING
2.4 REACTION TIME AND DECISION MAKING
2.5 MEMORY
2.6 FEEDBACK
2.7 MOVEMENT ANALYSIS

2.1 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 & Posner Model for Stages of Skill Learning: cognitive, associative & autonomous
    - Characteristics for each stage
    - Key points for instructional (coaches) support
    - Skill Learning Continuum
- Factors affecting skill acquisition *Knowledge to allow identification of characteristics listed here only is required*
    - Age & maturity
    - Gender
    - Heredity
    - Motivation
    - Quality of instruction
    - Others factors as applicable.

2.2 PRACTICING SKILLS

- Classification of Practice Types:
    - Massed practice and Distributed practice
    - Whole practice and Part practice
    - Blocked and Random practice
    - Varied and Constant practice
        - Schema Development (Schema theory Schmidt 1975) in the role of Varied Practice
    - Drill and Problem solving.

2.3 INFORMATION PROCESSING

- Basic outline & application of the learning process: Information Processing Model
    - Sensory Input
    - Processing
        - stimulus identification
        - response selection
        - response programming
    - Output (movement)
    - Feedback
- Receiving Information (Sensory Input)
    - Cues
    - Senses
        - Vision
        - equilibrium (balance)
        - proprioception (kinesthesis & touch)
        - hearing
    - Signal Detection
    - Orienting
    - Selective Attention
    - How a coach can help to improve a player's selective attention
        - making the relevant signals stand out
        - using language suited to the level of performer
        - including as few relevant cues as possible in initial practice
        - directing a player's attention to performance cues
        - basing explanations on the past experience of players.

2.4 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 and Decision Making
    - 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
- Reducing Reaction Time
    - Practice and the effect on choice RT
    - Anticipation
        - spatial (or event) anticipation
        - temporal anticipation
        - benefits of anticipation.

2.5 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
- Application of memory to learning and acquiring sporting skills
    - Schema.

2.6 FEEDBACK

- Main roles of feedback:
    - Motivate
    - Reinforcement
    - Regulate or change the performance
- Classifying (categories of) Feedback
    - Internal/Intrinsic (sensory: vision, audition, touch, proprioception, forces, smell)
    - External/Extrinsic (augmented)
    - Knowledge of performance (KP)
    - Knowledge of Results (KR)
- Timing of the Feedback
    - Continuous (concurrent)
    - Terminal (discrete).

2.7 MOVEMENT ANALYSIS

It is recommended that relevant aspects of the theory of movement analysis described below be delivered in conjunction with Study One of Module 4: Scientific Investigative Methodologies.

- Introduction to Biomechanics
- Kinematics: studies the description of motion
    - Motion
        - linear
        - angular
        - general
    - Projectile Motion
    - Factors affecting projectile motion
        - velocity of release
        - angle of release
        - height of release
        - shape
        - air resistance
        - spin
- Kinetics: studies influences on the movement of a body
    - Mass

    - Force (Newton's Laws of Motion 1, 2 (f=ma) and 3)
    - Levers
    - Balance
        - centre of gravity
        - stability
- *Principles of the Application of Biomechanical Knowledge*
  (according to Amezdroz, Dickens, Hosford, Stewart & Davis (2010), Queensland Senior Physical Education, 3rd Ed. Australia, Macmillan Education Australia):
    - Determine the objective of the skill
    - Using observation (naked eye & video analysis) techniques
    - Identify the movement patterns involved
    - Divide the skill into skill phases (key elements)
    - Detecting errors: application of the biomechanical principles (kinematics & kinetics) listed above
    - Identifying starter mechanisms.

INTERRELATIONSHIPS

The various topics and sub-topics noted above have limited meaning if they are treated discretely or in isolation.

Complex interrelationships also exist between Module 2's topics/sub-topics and those of Module 1 and Module 3.

Learners are required to identify and explain interrelationships between the topics/sub-topics studied in this Module (Skill Acquisition) and those studied in Module 1 (Exercise Physiology) and Module 3 (Sport Psychology). For example, an athlete's response time (Skill Acquisition) can be improved through isotonic resistance training (Exercise Physiology) which will contribute to sporting success.

The study of such interrelationships 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 Modules.

The interrelationships between Modules' topics will be studied throughout the year as links between them arise. When studies of interrelationships will occur will depend on the provider's choices regarding the sequence of delivery of Modules and topics/sub-topics: it is not intended that the study of interrelationships be a discrete activity undertaken only after the delivery of all the Modules.

MODULE 3: SPORT PSYCHOLOGY

TOPICS:

3.1 SELF CONFIDENCE IN SPORT AND EXERCISE
3.2 GOAL SETTING
3.3 PREPARATION FOR COMPETITION
3.4 MOTIVATION
3.5 AROUSAL/STRESS & ANXIETY
3.6 CONCENTRATION
3.7 VISUALISATION

3.1 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)
- Bandura (1977, *Psychological Review*, Vol 84(2), 1921-215) proposed four main antecedents of self-efficacy (factors that influence the level and strength of self-efficacy)
    - Performance accomplishments
    - Vicarious experiences
    - Verbal persuasion
    - Physiological states.

3.2 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 & 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
    - Action oriented or Agreed or Accepted
    - Realistic
    - Time framed or phased
    - Evaluate or Exciting
    - Recorded or Reviewed.

3.3 PREPARATION FOR COMPETITION

- Pre-competition Strategies
    - Prior to arriving at the competition venue
        - rest
        - diet
        - equipment check
        - spare time
        - travel
        - 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/Teams Game Plan
    - Performance Reference Points/checks
    - Task Relevant Factors
    - Mood/Cue Words
- Coping Strategies
    - Explanation & purpose: Secondary plans
    - Improve an athlete's ability to cope with Pain:
        - expect the pain
        - accept the pain
        - train for the pain
        - use the pain as a mental sign
- De-briefing
    - Guidelines for Debriefing
        - as soon after the performance as possible
        - identify performance factors which were omitted
        - identify ineffective strategy elements
        - involve the athlete.

3.4 MOTIVATION

- Explanation

- Self Determination Theory (Deci, Edward L and Ryan, Richard M (2002), Handbook of Self Determination Research, NY, University of Rochester Press.)
- Types of Motivation:
    - Positive
    - Negative
    - Intrinsic
    - Extrinsic: tangible & intangible rewards
    - Amotivation
- Motivational Techniques for Coaches and Athletes
    - Goal setting
    - Using extrinsic rewards
    - Motivational music
    - Positive self-talk.

3.5 AROUSAL/STRESS & 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 & cognitive functioning)
    - Physiological changes (somatic)
- Techniques to Control Arousal Levels
    - To raise arousal levels
    - To lower arousal levels (includes identifying various relaxation techniques).

3.6 CONCENTRATION

- Concentration and Attention
- Robert Nideffer's attentional dimensions (Nideffer, R.M. 1976, 'Test of attentional and interpersonal style' *Journal of personality and Social Psychology*, 34, 394-404)
    - Width (Broad and Narrow) & Direction (Internal and External) Dimensions
    - Four types of Attention
        - broad external
        - narrow external
        - broad internal
        - narrow internal
    - Advantages and disadvantages of each attentional style
- Athlete's 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
    - Choking
- Flow State.

3.7 VISUALISATION

- What is visualization (according to Syer, J & Connolly, C. (1998), Sporting Body, Sporting Mind: An athlete's guide to mental training, London, Simon & Schuster)
    - Senses involved
        - seeing/visual
        - hearing/auditory
        - touch/feeling/kinesthetic)

    - Why visualise?
        - the effect on physical functioning
        - it helps to accelerate the learning process
- Types of visualization (the two classes):
    - Problem solving uses visualization to:
        - aid concentration
        - reduce anxiety and physical tension
        - suggest possible cause of action
    - Mental rehearsal is the process of imagining yourself performing a specific movement or skill
      There are four mental rehearsal techniques:
        - performance practice
        - instant replay
        - during performance
        - performance review
- 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
    - Enjoy it!

INTERRELATIONSHIPS

The various topics and sub-topics noted above have limited meaning if they are treated discretely or in isolation.

Complex interrelationships also exist between Module 3's topics/sub-topics and those of Module 1 and Module 2.

Learners are required to identify and explain interrelationships between the topics/sub-topics studied in this Module (Sport Psychology) and those studied in Module 1 (Exercise Physiology) and Module 2 (Skill Acquisition). For example, athletes can focus on their narrow external attentional dimension (Sport Psychology) to improve their ability to detect relevant cues (Skill Acquisition).

The study of such interrelationships 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 Modules.

The interrelationships between Modules' topics will be studied throughout the year as links between them arise. When studies of interrelationships will occur will depend on the provider's choices regarding the sequence of delivery of Modules and topics/sub-topics: it is not indented that the study of interrelationships be undertaken as a discrete activity after the delivery of the Modules.

MODULE 4: SCIENTIFIC INVESTIGATIVE METHODOLOGIES AND SKILLS

(20 HOURS: SUGGESTED TIME)

This Module develops learners understanding of **scientific investigative methodologies and skills** within the context of a detailed study of two topics drawn from Modules 1–3.

Learners will undertake TWO (2) studies. One (1) study **will be** a movement analysis. One (1) study is **selected** from a topic chosen from Module 1 OR Module 3.

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.

> *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.*
>
> National Statement on Ethical Conduct in Human Research (2007) p.3.
> http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72.pdf (accessed 29 May 2012)

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 these. 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 6, standard 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, 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) http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/e72.pdf
- 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

STUDY 1 – MOVEMENT ANALYSIS (COMPULSORY)

It is recommended that the delivery of aspects of Module 2.7 'Movement Analysis' (sections 'kinematics' and 'kinetics…') relevant to the specific topic/focus of the study be undertaken in conjunction with this study.

NOTES:

> a) 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.
> b) The analysis will be limited to a 2 Dimensional analysis of a movement/set of movements that are easily observed in a single plain.

Learners can 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 Movement Analysis study will take full account of relevant principles and guidelines related to ethical conduct in human research.

The written product for the Movement Analysis study MUST contain and address the following topics:

- Aim/Hypothesis
- Background Research and Ethical Considerations (approximately 2 pages)
- Method (equipment list, procedure etc.)
- Results (includes tables, graphs etc all clearly labelled)
- Discussion
- Conclusions & Recommendations
- References (citation) and a reference list/bibliography.

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

- Determine the objective of the skill
- Using observation (naked eye & video analysis) techniques
- Identify the movement patterns involved
- Divide the skill into skill phases (key elements)
- Detecting errors: application of the biomechanical principles (kinematics & kinetics) listed above
- Identifying starter mechanisms.

The research will involve the use of video, and using 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 learner can:

- Criterion 2 – Demonstrate knowledge and understanding of the principles of skill acquisition
- Criterion 4 – Analyse and interpret sport science related data and information
- Criterion 6 – Access, research and evaluate information
- Criterion 7 – Communicate ideas in a variety of forms.

STUDY 2 – SELECTED TOPIC

The topic of this study can be **selected** from Module 1 OR Module 3. The topic must have a direct relationship to course content from the selected Module.

Learners can 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 Selected Investigative Study's written product MUST contain and address the following topics:

- Aim/Hypothesis
- Background Research and Ethical Considerations (approximately 2 pages)
- Method (equipment list, procedure etc.)
- Results (includes tables, graphs etc all clearly labelled)
- Discussion
- Conclusions & Recommendations
- References (citation) and a reference list/bibliography.

The assessment for the Selected Study is based on the degree to which a learner can:

- Criterion 1 OR 3 (Depending on the Module of study) – Demonstrate knowledge and understanding of <the physiological aspects of exercise> OR <psychological factors which influence athletic performance>
- Criterion 4 – Analyse and interpret sport science related data and information
- Criterion 6 – Access, research and evaluate information
- Criterion 7 – Communicate ideas in a variety of forms

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. For further information, see TASC's 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 for achievement specified in the course and the standards demonstrated by students
- community confidence in the integrity and meaning of the qualifications.

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 externally assessment requirements of this course consist of:

- A 3 hour written examination which assesses criteria 1, 2, 3, 4 and 5.

For further information, see the current external assessment specifications and guidelines.

Criteria

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

1. Demonstrate knowledge and understanding of the physiological aspects of exercise*
2. Demonstrate knowledge and understanding of the principles of skill acquisition*
3. Demonstrate knowledge and understanding of psychological factors which influence athletic performance*
4. Analyse and interpret sport science related data and information*
5. Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology*
6. Access, research and evaluate information
7. Communicate information in a variety of forms.

* = denotes criteria that are both internally and externally assessed

Standards

Criterion 1: Demonstrate knowledge and understanding of the 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 accurately defines and explains physiological terms related to exercise	correctly uses terminology when discussing physiological aspects of exercise, and correctly defines physiological terms related to exercise	correctly uses basic terminology when discussing physiological aspects of exercise, and correctly defines common physiological terms related to exercise
describes and explains principles and systems related to physiological aspects of exercise with accuracy and clarity	accurately describes principles and systems related to physiological aspects of exercise	describes principles and systems related to physiological aspects of exercise
accurately describes and explains the similarities/differences and relationships between both distinctive and closely related physiological principles/ systems of exercise	accurately describes the similarities/differences and relationships between both distinctive and closely related physiological principles/ systems of exercise	describes the similarities/differences and relationships between distinctive physiological principles/ systems of exercise
applies a wide range of relevant exercise physiology principles to a variety of situations	applies a range of relevant exercise physiology principles to given situations	applies some relevant exercise physiology principles to given situations
uses a wide range of relevant evidence and/or examples to support their discussion of physiological aspects of exercise.	uses relevant evidence and/or examples to support their discussion of physiological aspects of exercise.	uses evidence and/or examples to support their discussion of physiological aspects of exercise.

Criterion 2: Demonstrate knowledge and understanding of the principles of skill acquisition

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 explains terms related to skill acquisition	correctly uses terminology when discussing skill acquisition, and correctly defines terms related to skill acquisition	correctly uses basic terminology when discussing skill acquisition, and correctly defines common terms related to skill acquisition
describes and explains principles related to skill acquisition with accuracy and clarity	accurately describes principles related to skill acquisition	describes principles related to skill acquisition
accurately describes and explains the similarities/differences and relationships between both distinctive and closely related principles of skill acquisition	accurately describes the similarities/differences and relationships between both distinctive and closely related principles of skill acquisition	describes the similarities/differences and relationships between distinctive principles of skill acquisition
applies a wide range of relevant skill acquisition principles to a variety of situations	applies a range of relevant skill acquisition principles to given situations	applies some relevant skill acquisition principles to given situations

uses a wide range of relevant evidence and/or examples to support their discussion of skill acquisition.	uses relevant evidence and/or examples to support their discussion of skill acquisition.	uses evidence and/or examples to support their discussion of skill acquisition.

Criterion 3: Demonstrate knowledge and understanding of psychological factors which influence 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 explains terms related to sport psychology	correctly uses terminology when discussing sport psychology, and correctly defines terms related to sport psychology	correctly uses basic terminology when discussing sport psychology, and correctly defines common terms related to sport psychology
describes and explains principles related to sport psychology with accuracy and clarity	accurately describes principles related to sport psychology	describes principles related to sport psychology
accurately describes and explains the similarities/differences and relationships between both distinctive and closely related principles of sport psychology	accurately describes the similarities/differences and relationships between both distinctive and closely related principles of sport psychology	describes the similarities/differences and relationships between distinctive principles of sport psychology
applies a wide range of relevant sport psychology principles to a variety of situations	applies a range of relevant sport psychology principles to given situations	applies some relevant sport psychology principles to given situations
uses a wide range of relevant evidence and/or examples to support their discussion of sport psychology.	uses relevant evidence and/or examples to support their discussion of sport psychology.	uses evidence and/or examples to support their discussion of sport psychology.

Criterion 4: Analyse and interpret sport science related data and information

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
identifies and clearly communicates trends, relationships* and anomalies in sports science data and information	identifies and clearly communicates trends and relationships* that exists in sports science data and information	identifies some trends and relationships* that exists in sports science data and information
critically analyses and interprets sports science related data and information to make clear, logical and considered predictions	analyses sport science related data and information to make reasoned predictions	makes some valid prediction based on data and information
justifies a response or argument with accurate and relevant data/information	incorporates relevant data/information in support of a response or argument	makes some use of data/information in support of a response or argument
draws reasoned and logical conclusions based on analysis and interpretation of data.	draws valid conclusions based on interpretation of data.	draws some valid, basic conclusions based on interpretation of data.

* ‘Relationships’ involves comparisons/contrasts, similarities/differences.

Criterion 5: Demonstrate knowledge and understanding of interrelationships between exercise physiology, skill acquisition and sport psychology

This criterion is both internally and externally assessed.

With reference to two of the following topic areas: ***Exercise Physiology; Skill Acquisition;*** *and* ***Sports Psychology*** the learner:

Rating A	Rating B	Rating C
correctly identifies a range of interrelationships	correctly identifies a range of interrelationships	correctly identifies some simple interrelationships
correctly uses specialised terminology when discussing interrelationships	correctly uses terminology when discussing interrelationships	correctly uses basic terminology when discussing interrelationships
accurately explains terms and concepts when discussing interrelationships	explains terms and concepts when discussing interrelationships	explains some aspects of common terms and concepts when discussing interrelationships
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*	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*
justifies a response or argument with detailed and accurate examples, information and/or data.	incorporates relevant examples, information and/or data in support of a response or argument.	makes some use of examples, information and/or data in support of a response or argument.

Criterion 6: Access, research and evaluate 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 some valid conclusions about sport science issues
applies scientific investigative methodologies appropriate to a specific study	applies general scientific investigative methodologies to a specific study	applies general scientific investigative methodologies as instructed
critically evaluates the accuracy, scope and validity of information collected, and – when appropriate –analyses it in the light of similar studies undertaken by others	evaluates the accuracy and scope of information collected	makes some 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 some actions to address these.	identifies some relevant principles and guidelines of ethical conduct related to a human research study.

Criterion 7: 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 some appropriate formats*
produces written work 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 in which English usage is generally 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 the information, images, ideas and words of others used in the student's work	clearly identifies the information, images, ideas and words of others used in the student's work	differentiates the information, images, ideas and words of others from the student's own
clearly identifies sources of the information, images, ideas and words that are not the student's own. Referencing conventions and methodologies are followed with a high degree of accuracy	clearly identifies sources of the information, images, ideas and words that are not the student's own. Referencing conventions and methodologies are followed correctly	identifies the sources of information, images, ideas and words that are not the student's own. 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.

Notation to Criterion 7: 'Formats' might include:

- using ICT to create a PowerPoint presentation
- 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

HIGH ACHIEVEMENT

COMMENDABLE ACHIEVEMENT

SATISFACTORY ACHIEVEMENT

PRELIMINARY ACHIEVEMENT

Award Requirements

The final award will be determined by the Office of Tasmanian Assessment, Standards and Certification from the 12 ratings (7 ratings from the internal assessment and 5 ratings from the external assessment).

The minimum requirements for an award in this course are as follows:

EXCEPTIONAL ACHIEVEMENT (EA)
10 'A', 2 'B' ratings (4 'A', 1 'B' from external assessment)

HIGH ACHIEVEMENT (HA)
4 'A', 5 'B', 3 'C' ratings (2 'A', 2 'B' and 1 'C' from external assessment)

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

SATISFACTORY ACHIEVEMENT (SA)
10 'C' ratings (3 'C' from external assessment)

PRELIMINARY ACHIEVEMENT (PA)
6 'C' ratings

A learner 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 forwarded 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 Melissa Brown in the development of this course.

Accreditation

The accreditation period for this course is from 1 January 2013 to 31 December 2017.

Version History

Version 1 – Accredited version (10 August 2012). This course replaces Sport Science (SPT315108) which expired on 31 December 2012.

Supporting documents including external assessment material

- SPT315113 Asessment Report 2016.pdf (2017-07-21 01:05pm AEST)
- SPT315113 Assessment Report 2015.pdf (2017-07-21 01:05pm AEST)
- SPT315113 Exam Paper 2013.pdf (2017-07-21 01:05pm AEST)
- SPT315113 Exam Paper 2014.pdf (2017-07-21 01:05pm AEST)
- SPT315113 Exam Paper 2015.pdf (2017-07-21 01:05pm AEST)
- SPT315113 Exam Paper 2016.pdf (2017-07-21 01:05pm AEST)
- SPT315108 Assessment Report 2012.pdf (2017-07-27 08:12am AEST)
- SPT315113 Assessment Report 2013.pdf (2017-07-27 08:12am AEST)
- SPT315113 Assessment Report 2014.pdf (2017-07-27 08:12am AEST)
- SPT315108 Exam Paper 2012.pdf (2017-07-27 08:13am AEST)
- SPT315113 Examination Guidelines 2013 -2017.pdf (2017-08-18 08:55am AEST)
- SPT315113 Exam Paper 2017.pdf (2017-11-21 04:10pm AEDT)

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