COURSE DOCUMENT

SPORTS SCIENCE

COURSE CODE: [TASC ASSIGNS CODE]
LEVEL 3 / SIZE VALUE 15
CONTENTS

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RATIONALE

Sport Science is a rapidly expanding field which encompasses the physiological, psychological and skill acquisition components when planning and analysing human performance.

This course balances a theoretical focus with a range of applied experiences designed to allow students 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 students 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.

Students 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.

AIMS

Sport Science is a level 3 course in the Sport branch of the Health and Physical Education (HPE) suite of courses.

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:

- analyse and interpret theory supporting current practices in exercise physiology, skill acquisition, and sport psychology
- differentiate and explain how exercise physiology, skill acquisition, and sport psychology, contribute in isolation and combination to influence sporting performance
- utilise analytical and interpretive skills to solve problems and process data
- undertake scientific research activities and summarize ethical issues related to human research studies
- 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
- 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 improve athlete performance
- select, interpret, analyse and manipulate information from a variety of sources
- identify solutions to problems or practical situations and scenarios 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, Kinovea, and Hudl technique) — are available without cost.

Learners are assumed to 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 & Allied Health Careers; Human Movement; Exercise Science; Education; Health Science; Physiotherapy; Personal Training; Coaching and other Sport Related Careers.
RESOURCE REQUIREMENTS

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.
COURSE DESCRIPTION

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

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.

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 3 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.

The course encourages high-order thinking as students are challenged to consider the complex cross discipline links between core areas of study and to complete scientific investigative studies.

Learners will undertake a range of practical laboratory experiences and applied activities designed to build and reinforce understanding of work covered.

RELATIONSHIP TO OTHER TASC ACCREDITED SENIOR SECONDARY COURSES

Sport Science Level 3 extends on some of the topics and areas which appear in the Sport Science - Foundation Level 2 and Athlete Development Level 2 courses. While students who are studying these courses either sequentially or concurrently may have some advantages in dealing with familiar terms and broad concepts, this course examines those topics with much greater depth and detail and a significantly different perspective.
COURSE REQUIREMENTS

There are five (5) units in this course. Learners will undertake study of ALL units and ALL topics/subtopics. In Unit 5 students will complete one (1) compulsory study and one (1) selected study from topics in Unit 1, 2 or 4.

COURSE DELIVERY

Units in this course are designed to offer some latitude for varying the order and timing of delivery. Within each of the units teachers are strongly encouraged to consider the suggested sequence in their planning and delivery.

CROSS DISCIPLINE LINKS

The various units and topics they contain have limited meaning if they are treated discretely or in isolation. Complex cross discipline links also exist between Unit 1’s topics/sub-topics and those of Unit 2, Unit 3 and Unit 4.

Students are required to identify and explain cross discipline links between the topics/sub-topics studied across Units. For instance, there are many links between topics covered in Unit 3 (Skill Acquisition) and those studied in Unit 1 (Exercise Physiology), Unit 2 (Training and Conditioning) and Unit 4 (Sport Psychology). A specific example of this is 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 Units. The cross discipline links between Units’ topics will be studied throughout the year as links between them arise. Deciding when studies of cross discipline links will occur will depend on the provider’s choices regarding the sequence of delivery of Units and topics/sub-topics.

The study of cross discipline links should be both i) integrated during the year and ii) reinforced following the delivery of all the Units.

COURSE CONTENT

There are five (5) units in this course:

- Unit 1: Physiology A - Exercise Science
- Unit 2: Physiology B - Training and Conditioning
- 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 connection 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.

See also the requirements for Unit 5.

UNIT 1: PHYSIOLOGY A - EXERCISE SCIENCE

TOPICS
1.1 ENERGY & ENERGY SYSTEMS
1.2 OXYGEN DELIVERY
1.3 EFFECTS OF TRAINING

1.1 ENERGY & ENERGY SYSTEMS
- Energy
- Role of ATP:
  - structure
  - high energy bonds.
- Energy sources to replenish ATP:
  - 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
  - ATP storage and transportation.
- Phosphagen (ATP — CP or Anaerobic 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 (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 & 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 & Electron Transport System (not including enzymes)
    - fate of the by-products (heat, water & 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 of 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 discuss demands of endurance sports, intermittent team sports, player roles, etc. comparison in typical novice, intermediate and high performance athletes
  - in relation to fitness testing: calculate maximum aerobic speed
  - factors that affect an individual’s VO2 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 VO2 maximum and maximum heart rate
  - improving your Lactate Inflection Point (LIP)
  - buffering
  - LIP and VO2 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.
WORK REQUIREMENTS

Minimum work requirements Unit 1

<table>
<thead>
<tr>
<th>Task</th>
<th>Example Product</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1.1  Energy Systems Quiz</td>
<td>In class or online Quiz designed by teacher</td>
<td>1,8</td>
</tr>
<tr>
<td>Task 1.2  LIP/VO2 max Lab &amp; Report including results and tables (1000 words)</td>
<td>1. Lab Report or 2. Investigative Study (see 5.2)</td>
<td>1,5,7,8</td>
</tr>
<tr>
<td>Task 1.3 Test paper review (400-800 words)</td>
<td>1. End of unit test reflection and review or 2. Past Exam Question students attempt and review answer with the TASC exam solutions and examiners comments.</td>
<td>1.5 and 6 (if two units have been covered)</td>
</tr>
</tbody>
</table>
UNIT 2: PHYSIOLOGY B - TRAINING AND CONDITIONING

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 (effects) that occur
  - conditioning and/or skill development
  - cool-down
    - purpose
    - techniques
    - physiological effects.

- Principles
  - specificity
  - progressive overload
  - frequency
  - intensity
  - duration
  - de-training
  - variety
  - individuality
  - diminishing returns.

- Methods:
  - continuous
    - FITT formula (Frequency, Intensity, Time & Type)
  - LISS (Low Intensity Steady State)
  - long slow distance training
  - lactate threshold training
  - 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.)
  - resistance training key terms—repetition, set and repetition maximum
  - discussion—common principles and variables—manipulating volume/reps/sets
  - exercise ball (fit ball) training
- **plyometric principles**
- **safety considerations**
- **flexibility**
  - dynamic
  - proprioceptive neuromuscular facilitation
  - static.
- **circuit aims and advantages**
  - methods—(e.g. cross fit, boxercise, HITT, tabata, trx, etc.)
- **cross training aims and advantages**
- **methods**

- **The Training Year**
  - **Periodisation**
    - preparatory Pre-season (general preparation & specific preparation)
    - competitive phases/In Season (pre-competitive and competitive)
    - transition/Off season
  - **Peaking**
    - whole year peaking
    - in-season peaking & major events
    - tapering.
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)
    - contrast water therapy (CWT)
    - hot-water immersion (HWI)
    - massage
    - cryotherapy
    - compression
    - low intensity pool sessions

- Role of the O₂ transport system in recovery (EPOC) and O₂ Debt:
  - Alactacid Debt: replenishment of ATP & PC Stores, O₂ 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 rates for continuous & intermittent activity
  - rehydration: fluids & electrolytes.

- Delayed onset muscle soreness (DOMS)
  - characteristics
  - actions for minimizing impact/prevention
## WORK REQUIREMENTS

Minimum work requirements Unit 2

<table>
<thead>
<tr>
<th>Task</th>
<th>Example Product</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 2.1 Training Review (400-800 words)</td>
<td>1. Produce a table or graphic that compares common training methods by matching them to adaptation focus areas or 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.</td>
<td>2,6,7,8</td>
</tr>
<tr>
<td>Task 2.2 Lab Report including results and tables (1000 words)</td>
<td>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 or 5. Investigative Study</td>
<td>2,5,7,8</td>
</tr>
<tr>
<td>Task 2.3 Test paper review (400-800 words)</td>
<td>1. End of unit test reflection and review or 2. Past Exam Question students attempt and review answer with the TASC exam solutions and examiners comments.</td>
<td>2,5 and 6 (if two units have been covered)</td>
</tr>
</tbody>
</table>
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 MEMO RY
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 & 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 (discussion to include but not limited to):
  - age & 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
  - blocked and random practice
  - varied and constant practice

- schema development (Schema theory Schmidt 1975) in the role of Varied Practice.
  - drill and problem solving
  - aligning choice of practice type to learner and skill scenarios.

3.3 INFORMATION PROCESSING (Input, Processing, Output, Feedback)

- 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
    reducing the number and/or intensity of irrelevant cues (reducing “noise”)
    directing a player’s attention to performance cues
    basing explanations on the past experience of players.
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 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.

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:
  o motivate
  o reinforcement
  o regulate or change the performance - during activity
  o inform and improve future performance - post activity

- Classifying (categories of) Feedback
  o internal/intrinsic (sensory: vision, audition, touch, proprioception, forces, smell)
  o external/extrinsic (augmented)
  o knowledge of performance (KP)
  o knowledge of results (KR)

- Timing of the Feedback
  o continuous (concurrent)
  o 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
  o biomechanics and its role in sports science
  o fundamental concepts and applications
  o defining common anatomical terms (e.g. flexion, extension, abduction, anterior.)

- Kinematics: studies the description of motion
  o Motion
    linear
    angular
    general.
  o Projectile Motion
  o 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
  o mass
  o force (Newton’s Laws of Motion 1, 2 (f=ma) and 3)
  o levers
  o balance
    base of support
    centre of gravity
    stability.
  o 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 & Davis (2010), Queensland Senior Physical Education, 3rd Ed. Australia, Macmillan Education Australia):
  o determine the objective of the skill
  o using observation (naked eye & video analysis) techniques
  o identify the movement patterns involved
  o divide the skill into skill phases (key subroutines)
  o detecting errors: application of the biomechanical principles (kinematics & kinetics) listed above
  o identifying starter mechanisms.

WORK REQUIREMENTS

Minimum work requirements Unit 3

<table>
<thead>
<tr>
<th>Task</th>
<th>Example Product</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 3.1 Lab Report including results and tables (1000 words)</td>
<td>1. Classification of motor skills</td>
<td>3,5,7,8</td>
</tr>
<tr>
<td></td>
<td>2. Receiving Information (input)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Practice types and classification</td>
<td></td>
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<td></td>
<td>4. Reaction time, movements time or response time tests</td>
<td></td>
</tr>
<tr>
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<td>5. Factors affecting reaction time test</td>
<td></td>
</tr>
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<td></td>
<td>6. How memory impacts performance or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Classification of feedback</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task 3.2 Task 2.2 Investigative Study (3000-4000 words)</th>
<th>Unit 5 - Study 5.1</th>
<th>3,5,7,8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 3.3 Test paper review (400-800 words)</td>
<td>1. End of unit test reflection and review</td>
<td>3,5 and 6 (if two units have been covered)</td>
</tr>
<tr>
<td></td>
<td>2. Past Exam Question students attempt and review answer with the TASC exam solutions and examiners comments.</td>
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</table>
UNIT 4: SPORT PSYCHOLOGY

TO PICS:
4.1 SELF CONFIDENCE IN SPORT AND EXERCISE
4.2 GOAL SETTING
4.3 PREPARATION FOR COMPETITION
4.4 MOTIVATION
4.5 AROUSAL/STRESS & 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.)

- High Impact Variables and self-efficacy
  Bandura (1977, Psychological Review, Vol 84(2), 1921-215) proposed four main antecedents of self-efficacy (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 & 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
  o specific
  o measurable
  o achievable or action-oriented or agreed or accepted
  o realistic
  o time-framed or phased
  o evaluate or exciting
  o recorded or reviewed.

4.3 PREPARATION FOR COMPETITION

• Pre-competition Strategies
  o Lead up to event
    rest
    diet
    equipment check
    spare time
    travel plans
    mental preparation.
  o 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
  o your personal/team’s game plan
  o key statistics/performance reference points/checks
  o monitoring KPIs/ task relevant factors
  o mood/cue words.

• Coping Strategies
  o explanation & purpose: secondary plans
  o what ifs?
  o preparation to improve an athlete’s ability to cope
    managing pain and/or physical discomfort
    a hostile crowd
    discuss other scenarios ( eg. missed bus, equipment failure, violent team mate, media, etc.)

• De-briefing
  o guidelines for debriefing
    as soon after the performance as possible
    involve the athlete
    identify positive aspects of performance — i.e. what went right?
    identify negative aspects of performance — i.e. what went wrong?
    identify effective and ineffective strategies
    identify performance factors which were omitted
4.4 MOTIVATION

- Explanation

- Self Determination Theory

- Types of Motivation:
  - positive
  - negative
  - intrinsic
  - extrinsic: tangible & 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 & ANXIETY

- Stress - sources of stress (stresors)

- 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 (behavioral 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.)
4.6 CONCENTRATION

- Concentration and Attention

  
  o width (broad and narrow) & direction (internal and external) dimensions
  o four types of attention
    broad external
    narrow external
    broad internal
    narrow internal.
  o advantages and disadvantages of each attentional style.

- Athlete's Attentional Errors
  o attentional mismatch (due to dominant attentional style) under stressful conditions which may be inappropriate
  o inability to adopt or maintain appropriate attentional focus
  o internal and external overloads
  o involuntary internal narrowing
  o choking.

- Flow State
4.7 VISUALISATION

  
  o senses involved in
    seeing/visual
    hearing/auditory
    touch/feeling/kinaesthetic.

  o why visualize?
    the effect on physical functioning
    impacts on arousal and anxiety
    it helps to accelerate the learning process.

- Using Visualization:
  o mental rehearsal is the process of imagining yourself performing a specific movement or skill
  o mental rehearsal techniques:
    performance practice
    instant replay
    during performance
    performance review
    problem solving
    using visualization 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):
  o start with a relaxation
  o stay alert
  o use the present tense
  o set realistic goals
  o set specific goals
  o use all your senses
  o visualize from the inside out and from the outside in
  o visualize at the correct speed
  o practice regularly
  o enjoy it!
## Work Requirements

Minimum work requirements Unit 4

### Task 4.1 Sport Psychology Task (800-1200 words)

<table>
<thead>
<tr>
<th>Example Product</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Goal Setting in sport tasks: students set individual SMARTER goals and analyse the benefits of doing so.</td>
<td>4,6 (if possible), 7,8</td>
</tr>
<tr>
<td>2. Design pre-competition, competing and coping strategies for a sport of choice</td>
<td></td>
</tr>
<tr>
<td>3. Investigating reasons why people play sport i.e. what motivates them</td>
<td></td>
</tr>
<tr>
<td>4. Group Brainstorm session followed by individual Report or</td>
<td></td>
</tr>
<tr>
<td>5. Sport Psychology Skills for Travelling Flyer/ Handout</td>
<td></td>
</tr>
<tr>
<td>6. Sport Psychology Case Studies</td>
<td></td>
</tr>
</tbody>
</table>

### Task 4.2 Lab report – including results with graphs/tables (1000 words)

<table>
<thead>
<tr>
<th>Example</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Self-efficacy in sport Likert Scale</td>
<td>4,5,7,8</td>
</tr>
<tr>
<td>2. Investigating what motivates people to play sport</td>
<td></td>
</tr>
<tr>
<td>3. Application of the Inverted U hypothesis or Catastrophe Theory.</td>
<td></td>
</tr>
<tr>
<td>5. The Test of Attention and Interpersonal Style (TAIS)</td>
<td></td>
</tr>
<tr>
<td>6. Looking at the effectiveness of the different types of visualization</td>
<td></td>
</tr>
<tr>
<td>7. Investigative Study</td>
<td></td>
</tr>
</tbody>
</table>

### Task 4.3 Test paper review (400-800 words)

<table>
<thead>
<tr>
<th>Example</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. End of unit test reflection and review or</td>
<td>4, 5 and 6 (if two units have been covered)</td>
</tr>
<tr>
<td>2. Past Exam Question students attempt and review answer with the TASC exam solutions and examiners comments.</td>
<td></td>
</tr>
</tbody>
</table>
UNIT 5: SCIENTIFIC INVESTIGATIVE METHODOLOGIES AND SKILLS
(20 HOURS: SUGGESTED TIME)

This Unit develops students 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.


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 students to demonstrate their achievement on Criterion 6, standard element 4.

Where the specific topic/focus for the study is selected by the student/s, the student/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 (under review)

- UTAS ‘About Human Research Ethics’ webpage
STUDY 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:

a) The nature/scope of the movement that is analyzed 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 plane.

Students 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.

5.1 - WORK REQUIREMENTS

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

- Aim/Hypothesis
- Background Research and Ethical Considerations (1500 words submitted electronically)
- Method (equipment list, procedure etc.)
- Results (includes tables, graphs etc all clearly labelled)
- Discussion (1500-2000 words)
- 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 subroutines)
- 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 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.
STUDY 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.

Students 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 assessment for the Selected Investigative Study is based on Criteria 5, 7, 8 and either Criterion 1 OR 2 OR 4 (Depending on the Unit of study)

The degree to which a learner can:
- 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
- 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 - WORK REQUIREMENTS

The Selected Investigative Study’s written product MUST contain and address the following topics:

- Aim/Hypothesis
- Background Research and Ethical Considerations (1500 words submitted electronically)
- Method (equipment list, procedure etc.)
- Results (includes tables, graphs etc. all clearly labelled)
- Discussion (1500-2000 words)
- Conclusions & 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 3000 words in its written and graphic content.

RECOMMENDED REFERENCING SYSTEMS
- UTas Referencing Practices (current 2106)
- Human Movement - APA;
- Exercise & Health Sciences - Harvard
## WORK REQUIREMENTS - SUMMARY

<table>
<thead>
<tr>
<th>Unit</th>
<th>Task</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Task 1.1 Energy Systems Quiz</td>
<td>1,8</td>
</tr>
<tr>
<td></td>
<td>Task 1.2 LIP/VO2 max Lab &amp; Report</td>
<td>1,5,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 1.3 Test Paper Review</td>
<td>1,5,6</td>
</tr>
<tr>
<td>2</td>
<td>Task 2.1 Training Review</td>
<td>2,6,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 2.2 Lab &amp; Report</td>
<td>2,5,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 2.3 Test Paper Review</td>
<td>2,5,6</td>
</tr>
<tr>
<td>3</td>
<td>Task 3.1 Lab &amp; Report</td>
<td>3,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 3.2 Investigative Study</td>
<td>3,5,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 3.3 Test Paper Review</td>
<td>3,5,6</td>
</tr>
<tr>
<td>4</td>
<td>Task 4.1 Sport Psychology Task</td>
<td>4,6,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 4.2 Lab &amp; Report</td>
<td>4,5,7,8</td>
</tr>
<tr>
<td></td>
<td>Task 4.3 Test Paper Review</td>
<td>4,5,6</td>
</tr>
<tr>
<td>5</td>
<td>5.1 Movement Analysis</td>
<td>3, 5, 7, 8</td>
</tr>
<tr>
<td></td>
<td>5.2 Selected Investigative Study</td>
<td>1/2/4/5/7,8</td>
</tr>
</tbody>
</table>

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/), VLEs, etc. 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 processes, as well as on assessment, is on the TASC website: http://www.tasc.tas.gov.au

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 PROCESSES

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.

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 3 hour written examination which assesses criteria 1, 2, 3, 4, 5 and 6

For further information see the current external assessment specifications and guidelines for this course available on the TASC website.
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
3. *analyse and discuss principles 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 connections
7. access, research and analyse information
8. communicate information in a variety of forms.

* denotes criteria that are externally and internally assessed
STANDARDS

CRITERION 1: DESCRIBE AND ANALYSE PHYSIOLOGICAL ASPECTS OF EXERCISE

<table>
<thead>
<tr>
<th>RATING ‘C’</th>
<th>RATING ‘B’</th>
<th>RATING ‘A’</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learner:</td>
<td>The learner:</td>
<td>The learner:</td>
</tr>
</tbody>
</table>

- correctly uses basic terminology when discussing physiological aspects of exercise, and correctly defines common physiological terms related to exercise
- describes principles and systems related to physiological aspects of exercise
- describes and explains the similarities/differences and relationships between distinctive physiological principles and systems of exercise
- applies relevant exercise physiology principles to given situations
- uses evidence and/or examples to illustrate their discussion of physiological aspects of exercise.

- correctly uses terminology when discussing physiological aspects of exercise, and correctly explains physiological terms related to exercise
- accurately describes principles and systems related to physiological aspects of exercise
- analyse the similarities/differences and relationships between both distinctive and closely related physiological principles/systems of exercise
- relates and applies a range of relevant exercise physiology principles to given situations
- selects and uses relevant evidence and/or examples to support their discussion of physiological aspects of exercise.

- correctly uses specialised terminology when discussing physiological aspects of exercise, and connects and explains physiological terms related to exercise
- connects and explains principles and systems related to physiological aspects of exercise with accuracy and clarity
- analyses and evaluates similarities/differences and relationships between both distinctive and closely related physiological principles/systems of exercise
- analyses and applies a wide range of relevant exercise physiology principles to a variety of situations
- uses a wide range of relevant evidence and/or examples to compose their discussion of physiological aspects of exercise.
### Criterion 2: Analyse and Explain Physiological Responses to Training

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
</tr>
<tr>
<td>• uses physiological data and responses to identify critical issues and suggest fundamental training modifications</td>
<td>• uses physiological data and responses to identify relevant factors and explain suggested training modifications</td>
<td>• uses physiological data and responses to identify and classify relevant factors, proposes and justifies suggested training modifications</td>
</tr>
<tr>
<td>• differentiates some program approaches by explaining the target physiological adaptations</td>
<td>• differentiates and justifies appropriate program approaches by explaining the target physiological adaptations</td>
<td>• evaluates and compares appropriate program approaches by explaining the target physiological adaptations</td>
</tr>
<tr>
<td>• explains appropriate training methods and strategies for specific sports and athletes</td>
<td>• chooses and explains appropriate training methods and strategies for specific sports and athletes</td>
<td>• analyses, selects and explains appropriate training methods and strategies for specific sports and athletes</td>
</tr>
<tr>
<td>• reviews physiological data and provides general observations and recommendations</td>
<td>• analyses physiological data and provides appropriate explanations and general recommendations</td>
<td>• evaluates physiological data and provides assessment and specific recommendations</td>
</tr>
<tr>
<td>• explains range of contemporary methods used to balance athlete workload and recovery</td>
<td>• compares and explains range of contemporary methods used to balance athlete workload and recovery</td>
<td>• reviews and assesses methods used to balance athlete workload and recovery</td>
</tr>
<tr>
<td>• examines and discusses training outlines reflecting fundamentals of training program design</td>
<td>• prepares and discusses training outlines reflecting fundamentals of training program design</td>
<td>• evaluates, designs and justifies training outlines reflecting fundamentals of training program design</td>
</tr>
</tbody>
</table>
### CRITERION 3: ANALYSE AND DISCUSS THE PRINCIPLES OF SKILL ACQUISITION IN SPORT

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learner:</td>
<td>The learner:</td>
<td>The learner:</td>
</tr>
<tr>
<td>• correctly uses basic terminology when discussing skill acquisition, and correctly defines common terms related to skill acquisition</td>
<td>• correctly uses terminology when discussing skill acquisition, and correctly defines and explains terms related to skill acquisition</td>
<td>• correctly uses specialised terminology when discussing skill acquisition, and accurately defines and classifies terms related to skill acquisition</td>
</tr>
<tr>
<td>• describes principles related to skill acquisition</td>
<td>• accurately describes and explains principles related to skill acquisition</td>
<td>• describes and separates principles related to skill acquisition with accuracy and clarity</td>
</tr>
<tr>
<td>• describes similarities, differences and relationships between distinctive principles of skill acquisition</td>
<td>• accurately describes similarities, differences and relationships between both distinctive and closely related principles of skill acquisition</td>
<td>• accurately illustrates and explains similarities, differences and relationships between both distinctive and closely related principles of skill acquisition</td>
</tr>
<tr>
<td>• applies limited range of relevant skill acquisition principles to given situations</td>
<td>• applies a range of relevant skill acquisition principles to given situations</td>
<td>• applies a wide range of relevant skill acquisition principles to a variety of situations</td>
</tr>
<tr>
<td>• uses evidence and/or examples to support discussion of skill acquisition</td>
<td>• selects and analyses relevant evidence and/or examples to support their discussion of skill acquisition</td>
<td>• critically evaluates a wide range of relevant evidence and/or examples to support their discussion of skill acquisition</td>
</tr>
<tr>
<td>• recognises and discusses broad general observations and gross movement elements when comparing novice and expert performers</td>
<td>• analyses and discusses key observations in gross and subtle movement elements when comparing novice and expert performers</td>
<td>• evaluates and connects specific observations in gross and subtle movement elements when comparing novice and expert performers</td>
</tr>
<tr>
<td>• recognises and describes basic movement elements gathered using biomechanics and skill analysis software</td>
<td>• diagnoses and suggests improvements to movement elements gathered using biomechanics and skill analysis software</td>
<td>• examines and prioritises adjustments to movement elements gathered using biomechanics and skill analysis software</td>
</tr>
</tbody>
</table>
CRITERION 4  EXAMINE AND DISCUSS PSYCHOLOGICAL INFLUENCES ON ATHLETIC PERFORMANCE

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
</tr>
<tr>
<td>• correctly uses basic terminology when discussing sport psychology, and correctly defines common terms related to sport psychology</td>
<td>• correctly uses terminology when discussing sport psychology, and correctly defines and relates terms related to sport psychology</td>
<td>• correctly uses specialized terminology when discussing sport psychology, and accurately defines and connects terms related to sport psychology</td>
</tr>
<tr>
<td>• accurately describes and explains principles related to sport psychology</td>
<td>• describes and examines principles related to sport psychology with accuracy and clarity</td>
<td>• evaluates and explains principles related to sport psychology with accuracy and clarity</td>
</tr>
<tr>
<td>• recognises and describes similarities, differences and relationships between distinctive principles of sport psychology</td>
<td>• describes and compares the similarities, differences and relationships between both distinctive and closely related principles of sport psychology</td>
<td>• compares and contrasts the similarities, differences and relationships between both distinctive and closely related principles of sport psychology</td>
</tr>
<tr>
<td>• applies limited range of relevant sport psychology principles to given situations</td>
<td>• applies a range of relevant sport psychology principles to given situations</td>
<td>• applies a wide range of relevant sport psychology principles to a variety of situations</td>
</tr>
<tr>
<td>• uses evidence and/or examples to support their discussion of sport psychology.</td>
<td>• uses relevant evidence and/or examples to support their discussion of sport psychology.</td>
<td>• uses a wide range of relevant evidence and/or examples to support their discussion of sport psychology.</td>
</tr>
<tr>
<td>CRITERION 5: ANALYSE AND INTERPRET SPORT SCIENCE DATA AND INFORMATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RATING 'C'</strong></td>
<td><strong>RATING 'B'</strong></td>
<td><strong>RATING 'A'</strong></td>
</tr>
<tr>
<td>The learner:</td>
<td>The learner:</td>
<td>The learner:</td>
</tr>
<tr>
<td>• identifies trends and relationships* that exist in sports science data and information</td>
<td>• identifies and clearly communicates trends and relationships* that exist in sports science data and information</td>
<td>• identifies and clearly communicates trends, relationships* and anomalies in sports science data and information</td>
</tr>
<tr>
<td>• makes valid predictions based on data and information</td>
<td>• analyses sport science related data and information to make reasoned predictions</td>
<td>• critically analyses and interprets sports science related data and information to make clear, logical and considered predictions</td>
</tr>
<tr>
<td>• makes use of data/information in support of a response or argument</td>
<td>• fluently incorporates relevant data/information in support of a response or argument</td>
<td>• fluently incorporates and justifies a response or argument with accurate and relevant data/information</td>
</tr>
<tr>
<td>• draws valid, basic conclusions based on interpretation of data.</td>
<td>• draws valid conclusions, and makes logical connections based on interpretation of data</td>
<td>• draws reasoned and logical conclusions and makes recommendations based on analysis and interpretation of data.</td>
</tr>
<tr>
<td>• operates a variety of testing apparatus to measure, and record data</td>
<td>• operates and calibrates a variety of testing apparatus to measure, and accurately record and compare data</td>
<td>• operates and calibrates a wide range of testing apparatus to measure, accurately record and analyse data</td>
</tr>
</tbody>
</table>

* 'Relationships' involves comparisons/contrasts, similarities/differences.
## CRITERION 6 EXAMINE AND DISCUSS CROSS DISCIPLINE CONNECTIONS

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
</table>
| With reference to two of the following discipline areas:  
  - exercise physiology  
  - skill acquisition  
  - sports psychology  
  the learner:  
  - correctly identifies and explains general impacts of simple cross discipline links  
  - correctly uses basic terminology when discussing cross discipline links  
  - explains aspects of common terms and concepts when discussing cross discipline links  
  - 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  
  - makes use of examples, information and/or data in support of a response or argument. |
| With reference to two of the following discipline areas:  
  - exercise physiology  
  - skill acquisition  
  - sports psychology  
  the learner:  
  - correctly identifies and compares several key elements across a limited range of cross discipline links  
  - correctly uses terminology when discussing a range of cross discipline links  
  - explains terms and concepts when discussing a range of cross discipline links  
  - 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  
  - fluently incorporates relevant examples, information and/or data in support of a response or argument. |
| With reference to two of the following discipline areas:  
  - exercise physiology  
  - skill acquisition  
  - sports psychology  
  the learner:  
  - correctly examines and explains detailed impacts across a wide range of cross discipline links  
  - correctly uses specialised terminology when discussing a wide range of cross discipline links  
  - accurately explains and illustrates terms and concepts when discussing a wide range of cross discipline links  
  - 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  
  - fluently incorporates and justifies a response or argument with detailed and accurate examples, information and/or data. |
## CRITERION 7 ACCESS, RESEARCH AND ANALYSE INFORMATION

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
<tbody>
<tr>
<td>The learner:</td>
<td>The learner:</td>
<td>The learner:</td>
</tr>
<tr>
<td>- selects information and correctly extracts basic meaning to form a response and reach valid conclusions about sport science issues</td>
<td>- analyses sources and selects relevant information, and correctly extracts meaning to form a considered response and reach valid conclusions about sport science issues</td>
<td>- 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</td>
</tr>
<tr>
<td>- applies general scientific investigative methodologies as directed</td>
<td>- chooses and applies general scientific investigative methodologies to a specific study</td>
<td>- chooses, justifies and applies scientific investigative methodologies appropriate to a specific study</td>
</tr>
<tr>
<td>- makes valid observations regarding the accuracy and scope of the information collected</td>
<td>- assesses the accuracy and scope of information collected</td>
<td>- critically evaluates the accuracy, scope and validity of information collected, and — when appropriate — analyses it in the light of similar studies undertaken by others</td>
</tr>
<tr>
<td>- identifies relevant principles and guidelines of ethical conduct related to a human research study.</td>
<td>- identifies relevant principles and guidelines of ethical conduct related to a human research study, and proposes some actions to address these.</td>
<td>- identifies relevant principles and guidelines of ethical conduct related to a human research study, and proposes effective actions to address these.</td>
</tr>
<tr>
<td>- uses online searching to collate and store information which is current and relevant</td>
<td>- effectively uses suitable online search tools and selectively filters information from more than one source for currency, quality and relevance</td>
<td>- effectively uses suitable online search tools and selectively evaluates information from multiple sources for validity, currency, quality and relevance</td>
</tr>
</tbody>
</table>
### CRITERION 8 COMMUNICATE IDEAS AND INFORMATION IN A VARIETY OF FORMS

<table>
<thead>
<tr>
<th>RATING 'C'</th>
<th>RATING 'B'</th>
<th>RATING 'A'</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
<td><strong>The learner:</strong></td>
</tr>
</tbody>
</table>

- **conveys ideas and basic information using appropriate formats**
- **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 simple graphs and tables to communicate sport science data/information**
- **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 reference lists/bibliographies.**

- **clearly conveys ideas and information using appropriate formats**
- **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)**
- **creates appropriate and clear graphs and tables to communicate sport science data/information**
- **clearly identifies sources of the information, images, ideas and words that are not the student’s own. Referencing conventions and methodologies are followed correctly**
- **creates appropriate, structured reference lists/bibliographies.**

- **clearly and accurately conveys ideas and 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)**
- **creates appropriate and clear graphs and tables to communicate complex 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 appropriate, well structured reference lists/bibliographies.**
* **Notation to Criterion 8:**

'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
HIGH ACHIEVEMENT
COMMENDABLE ACHIEVEMENT
SATISFACTORY ACHIEVEMENT
PRELIMINARY ACHIEVEMENT

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 is from [text to be inserted by TASC].

VERSION HISTORY

State if this course is a direct replacement of any existing course. TASC will give the document a version number/date.

Version [insert version number] — Accredited on [TASC will insert accreditation date] for use from [TASC will insert date]. This course replaces SPT215113 Sport Science that expired on 31 Dec 2017.

VERSION CONTROL

This document is a Word version of the course. It is not a TASC controlled version. The current PDF version of the course on the TASC website is the definitive one.
APPENDICES

- GLOSSARY

- LINE OF SIGHT
GLOSSARY OF TERMS - SPORT & EXERCISE SCIENCE

[**Glossary words to be bolded**]

**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 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 behaviors 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 (C₃H₆O₃) 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 behavioral aspects of movement

**Motor Development**: is the sequential, continuous age-related process whereby movement behavior 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**:

GLOSSARY

Overarching definitions
Analyse: break information into parts to explore understanding and relationships (comparing, organise, deconstruct, interrogate, find)
Apply: use information in another familiar situation (implement, carry out, use, execute) Best practice: On the basis of all available evidence the practice can be expected to produce the most favourable outcome
Client: individuals, groups, teams or organisations who use the services of an exercise science professional
Describe: give a detailed account of in words
Evaluate: justify a decision or course of action (check, hypothesise, critique, experiment, judge)
Exercise: a specific type of physical activity that is repetitive and planned with the objective of improving or maintaining physical activity. Exercise includes various exercise modalities such as endurance, anaerobic, flexibility, resistance, balance and agility exercise, which can be performed over a range of intensities, frequencies and durations within a variety of environments
Exercise science: the science of exercise for health, fitness and sports performance
Identify: establish or indicate what something is
Integrate: combine (one thing) with another to form a whole
Physical activity: a general term for any body movement performed with skeletal muscles that results in an increase in energy expenditure
Sport: physical activity capable of achieving a result and requiring physical exertion and/or physical skill, and which, by its nature and organisation, is competitive
Understand: explain ideas or concepts (interpret, summarise, paraphrase, classify, explain)

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

Biomechanics
Analysing: describing the characteristics of human movement from qualitative and quantitative perspectives
Biomechanical services: the design, conduct and reporting of biomechanical analysis in research, scientific support (e.g. elite sport), education and consultancy
Biomechanics: the study of biological systems from an anatomical and a mechanical perspective
Mechanics: a branch of physics that, in the exercise and sport context, is involved with the anatomical and dynamic aspects of human movement and the surfaces and equipment involved
Movement asymmetry: imbalances in bilateral muscle strength
Physical effects of human interaction with equipment and the environment: Interactions with various types and conditions of sport surfaces and environmental conditions
Technique: the pattern and sequence of movements required to produce the prescribed action efficiently, or an efficient and competitive action, or the desired action efficiently

Exercise delivery
Apparently healthy client: clients who are considered on the basis of their health status to be at low risk of adverse events during exercise. Includes children, adolescents, older adults, pregnant women (including women from early pregnancy to late-stage post-partum), and clients requiring weight management
Data: recording information/measurements on heart rate, blood pressure, workload, risk status and training or activity history
Exercise delivery: the implementation of an exercise program for individuals or groups, with a particular emphasis on the practical aspects of leadership of exercise sessions. Mode of delivery may be face-to-face or distance
Exercise load: components of exercise prescription that, for a given type and mode of exercise, contribute to the exercise ‘dose’: includes intensity, frequency, duration, work-to-rest ratio, recovery time and movement rate
Prescribing: designing an exercise program
Safety measures: may include modifying or ceasing exercise, application of first aid, or referral to another medical or health professional

Exercise physiology

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

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

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

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

Exercise prescription

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

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

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

Health, exercise and sport assessment

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

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

Health and fitness evaluation: a process that includes pre-exercise screening and risk appraisal; measurement of components that contribute to physical fitness, including cardiorespiratory endurance, muscular strength and fitness, flexibility and body composition; analysis and interpretation of the test results; and provision of feedback to the participant and other relevant personnel (e.g. other health professionals)

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

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

Health, exercise, and sport psychology

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

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

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

Human physiology

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

Motor control and learning

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

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

Nutrition

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

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

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

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

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

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

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

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

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

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

Sedentary behaviour: activities that have a low energy requirement

Professional practice

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

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

Research methods and statistics

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

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

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

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

Reference:

Exercise Science Standards — Australia (accessed Sept 2016)

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/
<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Unit</th>
<th>Criterion &amp; Elements</th>
</tr>
</thead>
</table>
| analyse and interpret theory supporting current practices in exercise physiology, skill acquisition, and sport psychology | 1,2,3,4,5 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |
| differentiate and explain how exercise physiology, skill acquisition, and sport psychology, impact in isolation and combination to influence sporting performance | 1,2,3,4 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5 |
| utilise analytical and interpretive skills to solve problems and process data    | 1,2,3,4,5 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |
| undertake scientific research activities and summarize ethical issues related to human research studies | 5   | C5 E 1-5 |
| 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 | 1,2,3,4,5 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |
| 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 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |
| select, interpret, analyse and manipulate information from a variety of sources | 1,2,3,4,5 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |
| identify solutions to problems or practical situations and scenarios in exercise physiology, skill acquisition, and sport psychology | 1,2,3,4,5 | C1 E 1-5  
C2 E 1-6  
C3 E 1-7  
C4 E 1-5  
C5 E 1-5 |