

Higher National Unit Specification

General information for centres

Unit title: Anatomy, Physiology and Energy Systems

Unit code: DD2V 34

Unit purpose: This unit introduces candidates to the broad nature of Anatomy and Physiology within the context of sport. It also introduces candidates to the importance of the structure and function of the body systems and the effects of exercise upon them.

On completion of this unit, the candidate will be able to:-

1. Describe the structure and function of the main body systems.
2. Describe the short term effects of exercise on the body.

Credit value: 1 HN Credit at SCQF level 7: (8 SCOTCAT credit points at SCQF level 7*)

**SCOTCAT points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCOTCAT points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to doctorates.*

Recommended prior knowledge and skills: Knowledge, skills and / or experience relevant to the unit would be beneficial. Units such as Human Physiology and the Development of Performance, (D681 12) or equivalent, would be useful. Ultimately entry is at the discretion of the centre.

Core skills: There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

Context for delivery: If this Unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes. This unit is included in the framework for HNC/D Sports Coaching with Development of Sport.

Assessment: The unit will be assessed by one instrument of assessment covering both unit outcomes. This will take the form of restricted response assessments. These will be conducted under supervision. An exemplar instrument of assessment and marking guidelines have been produced to indicate the national standard of achievement required at SCQF Level 7

Higher National Unit specification: statement of standards

Unit title: Anatomy, Physiology and Energy Systems

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe the structure and function of the main body systems.

Knowledge and/or skills

- Skeletal system
- Muscular system
- Respiratory system
- Cardiovascular system
- Energy system

Evidence requirements

The candidate will be assessed by 5 restricted response assessment papers (one per system). To achieve this outcome each candidate will require written evidence to demonstrate their understanding on all aspects of the knowledge and/or skills section. Each candidate will be required to describe the structure and function of the main body systems. An acceptable standard of achievement would be indicated by a 70% pass mark for each paper.

Assessment guidelines

Candidates would be required to produce accurate written responses that demonstrate their understanding of the structure and function of the main body systems. To reduce the assessment load on candidates, it is possible to integrate, thus reducing the number of single assessment events.

Higher National Unit specification: statement of standards (cont)

Unit title: Anatomy, Physiology and Energy Systems

Outcome 2

Describe the short term effects of exercise on the body.

Knowledge and/or skills

- Effects on:-
 - Skeletal system
 - Muscular system
 - Respiratory system
 - Cardiovascular system

Evidence requirements

To achieve this outcome each candidate will require written evidence to demonstrate their understanding on all aspects of the knowledge and/or skills section. Each candidate will be required to describe the short term effects of exercise on the body. The instrument of assessment will be a restricted response paper. Competence will be demonstrated where candidates provide evidence of two effects with satisfactory explanations for each effect. This will apply to the above systems. This will be produced under exam conditions.

Assessment guidelines

Candidates would be required to produce accurate written responses that clearly demonstrate their understanding of the short term effects of exercise on the body.

Administrative Information

Unit code: DD2V 34

Unit title: Anatomy, Physiology and Energy Systems

Superclass category: RH

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Higher National Unit specification: support notes

Unit title: Anatomy, Physiology and Energy Systems

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

The unit is likely to form part of a group award and is primarily designed to provide candidates with knowledge of the broad nature of the structure and function of the main body systems and the short term effects of exercise on the body. It is therefore likely that the unit will be delivered early in year one of an HNC award.

Outcome 1

Skeletal System

- Axial and appendicular skeleton
- Bone tissue development (ossification process, growth plates).
- Joints – type, classification and structure
- Terminology of movement

Muscular System

- Structure of skeletal muscle –fibres bundles, origins and insertions
- Different types of muscle – skeletal, smooth, cardiac
- Function of skeletal muscle
- Muscular action – eccentric, concentric, isometric
- Sliding filament theory

Respiratory System

- Anatomy – oral/nasal cavity, trachea, bronchus, bronchioles, alveoli
- Mechanics of breathing – diaphragm, intercostals muscles, plural membrane
- Gaseous exchange, diffusion, delivery of oxygen, removal of carbon dioxide
- Exchange of air volumes – tidal volume, residual volume, vital capacity, total lung volume, expiratory reserve

Cardiovascular System

- Structure – atrium, ventricles, valves, septum, aorta, superior / inferior vena cava, pulmonary arteries/veins
- Structure and function of the vascular system
- Redistribution of blood flow – vasodilation/vasoconstriction

Higher National Unit specification: support notes (cont)

Unit title: Anatomy, Physiology and Energy Systems

Energy Systems

- Aerobic – oxidation of foods i.e. fats ,carbohydrate, protein
- Anaerobic – adenosine tri-phosphate(ATP), creatine phosphate(CP)
- Post exercise recovery of both systems, energy replacement – glycogen
- Effects of lactic acid production /removal during exercise

Outcome 2

Skeletal – short term effects:

- Increased bone density
- Stronger /thicker tendons
- Increased blood flow effects

Muscular – short term effects:

- Increased muscular strength
- Increased size of mitochondria
- Hypertrophy

Respiratory – short terms effects:

- Increased tidal volume/vital capacity
- Decreased residual volume
- Increased gaseous exchange

Cardiovascular – short term effects:

- Increased stroke volume/cardiac output
- Lower resting heart rate
- Increased venous return

Guidance on the delivery and assessment of this Unit

Outcome 1

Assessment may be undertaken when appropriate at the discretion of the centre.

Outcome 2

The candidate should show underpinning knowledge and understanding from the previous outcome, this should be achieved by transferring skills from theory and using this information to relate to the short effects of exercise on the body.

It would be beneficial to deliver the outcomes in sequence, due to the nature of the content and logical progression of the outcomes.

Higher National Unit specification: support notes (cont)

Unit title: Anatomy, Physiology and Energy Systems

Open learning

Open learning implies that, while candidates study out with the centres using materials provided, it would be necessary to attend the centre for assessment purposes. For further information of Open and Distance Learning, please refer to the SQA publication, Assessment and Quality Assurance of Open and Distance Learning (SQA 2000).

Special needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, 2001).

General information for candidates

Unit title: Anatomy, Physiology and Energy Systems

This unit introduces you to the main body systems and how as a sports coach these apply to your understanding of the body and its uses, and limitations, in the coaching environment.

The unit looks at how these affect performance and it will give you a better understanding of how to increase the participants' ability in a practical environment.

On completion of this unit you will be able to describe the structure and function of the main body systems and the short term effects of exercise on these systems.

Both outcomes will be assessed using restricted response questions. All assessment will be done under supervision.

BIBLIOGRAPHY

Fitness Leaders Handbook – Egger, Champion and Hurst, Kangaroo Press 2000

Fitness Leaders Exercise Bible - Egger, Champion and Hurst, Kangaroo Press 2000

Physiology and Performance – Ledger and Carpenter, National Coaching Foundation 1997

The Human Body- an illustrated guide to its structure, function and disorders – Dorling Kindersley 2000

The Human Body made simple – E. Tamir, Harcourt Publishers 2002.

Higher Grade Human Biology – J. Torrance, Hodder and Stoughton 1999.