Higher National Unit specification: general information

Unit title: Cells and the Human Environment

Unit code: H1LJ 34

Superclass: RH

Publication date: September 2012

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit provides underpinning knowledge and understanding of cells and their role in the human body for students studying Sports Science who wish to articulate onto a variety of Higher level courses such as Sport Nutrition, Human Health, Pharmacology or Physiotherapy.

On completion of the Unit the candidate should be able to have an understanding of the cell and its role within the human body and should be able to:

1 Describe the biological nature of cells.
2 Demonstrate knowledge of cellular communication and homeostasis
3 Describe the effects of environmental conditions on athletic performance.

Recommended prior knowledge and skill

Access to this Unit will be at the discretion of the centre. There are no specific entry requirements; however, it is recommended that candidates should have experience of studying Biology at Intermediate 2.

Credit points and level:

1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit 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 SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

General information (cont)

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

This Unit is an optional Unit in the HND Applied Sports Science Group Award. It is recommended that the Unit should be taught and assessed within the context of the particular Group Award to which it contributes.

Assessment

Outcome 1 should be assessed by a question paper carried out under closed-book supervised assessment conditions. The question paper should cover all the knowledge and skills areas identified in Outcome 1.

Outcome 2 should be assessed by question paper carried out under closed-book supervised assessment conditions. The question paper should cover all the knowledge and skills areas identified in Outcome 2.

Outcomes 1 and 2 may be assessed by holistic assessment under closed-book supervised conditions. Questions should be allocated to cover each of the knowledge and skills identified in Outcome 1 and Outcome 2. Assessment for both Outcomes should be no more than one hour in total. Candidates should obtain at least 60% of the marks available in order to achieve a pass for the Outcomes. Candidates should have evidence to show they have achieved all the knowledge and skills areas.

Outcome 3 should be assessed by a project. The project should be in the form of a submission of between 1,000 and 1,500 words. Candidates must meet all the performance skills specified in the Evidence Requirements for all three Outcomes to achieve the Unit.

Higher National Unit specification: statement of standards

Unit title: Cells and the Human Environment

Unit code: H1LJ 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Outcome 1

Describe the biological nature of cells.

Knowledge and/or Skills

- Cell membrane structure.
- Eukaryotic transport processes.
- Eukaryotic organelles.

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- Describe the cell membrane in terms of the fluid mosaic model.
- Describe the structure and function of eukaryotic organelles.
- Explain the mechanisms involved in transport of small and large molecules.

Assessment Guidelines

Outcome 1 should be assessed by a question paper carried out under closed-book supervised assessment conditions. The question paper should cover all the knowledge and skills areas identified in Outcome 1.

Outcomes 1 and 2 may be assessed by holistic assessment under closed-book supervised conditions. Questions should be allocated to cover each of the knowledge and skills identified in Outcome 1 and Outcome 2. Assessment for both Outcomes should be no more than one hour in total. Candidates should obtain at least 60% of the marks available in order to achieve a pass for the Outcomes. Candidates should have evidence to show they have achieved all the knowledge and skills areas.

Higher National Unit specification: statement of standards (cont)

Unit title: Cells and the Human Environment

Outcome 2

Demonstrate knowledge of cellular communication and homeostasis.

Knowledge and or Skills

- Cell to cell recognition.
- Cell to cell communication.
- Homeostasis, negative feedback and the role of the autonomic nervous system and endocrine system.

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- demonstrate an understanding of the cell surface molecules involved in cell recognition
- demonstrate an understanding of the different mechanisms involved in communication between adjacent cells and communication between distantly located cells

Assessment Guidelines

Outcome 2 should be assessed by question paper carried out under closed-book supervised assessment conditions. The question paper should cover all the knowledge and skills areas identified in Outcome 2.

Outcomes 1 and 2 may be assessed by holistic assessment under closed-book supervised conditions. Questions should be allocated to cover each of the knowledge and skills identified in Outcome 1 and Outcome 2. Assessment for both Outcomes should be no more than one hour in total. Candidates should obtain at least 60% of the marks available in order to achieve a pass for the Outcomes. Candidates should have evidence to show they have achieved all the knowledge and skills areas.

Higher National Unit specification: statement of standards (cont)

Unit title: Cells and the Human Environment

Outcome 3

Describe the effects of environmental conditions on athletic performance.

Knowledge and/or Skills

- Altitude
- Temperature
- Acclimatisation
- Homeostatic responses

Evidence Requirements

The candidate has to research the environmental conditions on athletic performance, investigating all the knowledge and skills areas and they must prepare a report of between 1,000 and 1,500 words in length.

Assessment Guidelines

Outcome 3 should be assessed by a project. The project should be in the form of a submission of between 1,000 and 1,500 words. Candidates must meet all the performance skills specified in the Evidence Requirements for all three Outcomes to achieve the Unit.

Higher National Unit specification: support notes

Unit title: Cells and the Human Environment

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

Outcome 1

Looks at the structure and function of eukaryotic cell components. Candidates should become familiar with the following:

- fluid mosaic model: lipid bilayer; hydrophobic/hydrophilic nature; integral and peripheral proteins; attachment of carbohydrate groups; mobility; permeability
- transport of small molecules: active and passive transport; simple and facilitated diffusion
- transport of large molecules: exocytosis; receptor-mediated endocytosis; pinocytosis; phagocytosis
- common eukaryotic organelles: nucleus; mitochondria; chloroplasts; Golgi apparatus; lysosomes; endoplasmic reticulum (rough and smooth); vacuoles; cell walls

Outcome 2 looks at the role of cellular communication and homeostasis in controlling body activities.

Homeostasis: negative feedback, positive feedback, role of autonomic nervous system, temperature regulation, pH balance, water regulation, control of glucose levels.

Outcome 3 involves undertaking a written investigation into the effects of environmental conditions on athlete performance relating to the maintenance of homeostasis and cellular function.

Guidance on the delivery and assessment of this Unit

This Unit is primarily intended to provide candidates studying for the Group Award in Sport and Exercise Science with a fundamental understanding of cell biology. This Unit will provide knowledge essential to the understanding of the functions of cells in the body, and in the part played by cells in human health and performance.

Online and Distance Learning

If this Unit is delivered by open or distance learning methods, additional planning resources may be required for candidate support, assessment and quantity assurance. A combination of new and traditional authentication tools may have to be devised for assessment and reassessment purposes.

Higher National Unit specification: support notes (cont)

Unit title: Cells and the Human Environment

Opportunities for developing Core Skills

An opportunity to gather evidence towards *Information and Communication Technology (ICT)* and *Communication* Core Skills may be gathered from the LO3 report.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

History of changes to Unit

Version	Description of change	Date

General information for candidates

Unit title: Cells and the Human Environment

This Unit is intended for delivery as part of the Sport and Exercise Science Group Award at HND level. The Unit is primarily intended to provide you with a fundamental understanding of the human body at a cellular level. You will look at the structure and function of the cell membrane and internal organelles. You will also look at how cells transport materials into and out of the cell and how cells communicate with each other. You will look at how the body controls the internal environment by both nervous and endocrine pathways and will research how the body maintains equilibrium in a variety of environments. By the end of the Unit you will have an understanding of how the body functions at a cellular level and how it responds to internal environmental changes and how the body copes under the stress of exercise.

Learning Outcome 1 will look at the cell membrane fluid mosaic model, the structure and function of organelles such as mitochondrion, endoplasmic reticulum and golgi body.

Learning Outcome 2 will look at homeostasis, negative feedback and the role nervous and endocrine systems in maintaining an internal equilibrium.

Learning Outcome 3 will be a research based project looking at the effects of altitude and extremes of temperature during exercise, and the control mechanisms that counteract these stresses.