



## **Higher National Unit specification: general information**

**Unit title:** Sports Science: Microbiology and Immunology

**Unit code:** H1LG 34

**Superclass:** RH

**Publication date:** September 2012

**Source:** Scottish Qualifications Authority

**Version:** 01

### **Unit purpose:**

The purpose of this Unit is to provide candidates with a sound understanding of the types, distribution and significance of micro-organisms and a basic knowledge of the human immune system. The Unit will provide fundamental knowledge regarding the major microbial groups which candidates are likely to encounter within fitness, health and nutrition. The Unit will support candidates requiring the underpinning knowledge to go on and explore the relationship between exercise and immunity. This Unit is primarily intended for candidates who propose to pursue a career in a sport or health related area that are following the HND Group Award in Sport and Exercise Science.

On completion of the Unit the candidate should be able to:

- 1 Describe the major microbial groups of microorganisms and factors affecting their growth.
- 2 Describe the major components of the immune system.
- 3 Investigate the relationship between exercise, the immune system and susceptibility to infection.

### **Recommended prior knowledge and skills:**

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.

## **General information (cont)**

### **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.*

### **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 delivered as part of the Group Award, HND in Sports and Exercise Science, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

## Higher National Unit specification: statement of standards

**Unit title:** Sports Science: Microbiology and Immunology

**Unit code:** H1LG 34

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

### Outcome 1

Describe the major microbial groups of microorganisms.

#### Knowledge and/or Skills

- ◆ Bacteria
- ◆ Fungi
- ◆ Protista
- ◆ Viruses and sub-viral particles
- ◆ Factors affecting growth

#### Evidence Requirements

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

- ◆ describe the major characteristics of bacteria
- ◆ describe the major characteristics of fungi
- ◆ describe the major characteristics of protista
- ◆ describe the major characteristics of viruses and sub-viral particles
- ◆ explain the effect of biotic and abiotic factors on microbial growth and death.

## Higher National Unit specification: statement of standards (cont)

**Unit title:** Sports Science: Microbiology and Immunology

### Outcome 2

Describe the major components of the immune system.

#### Knowledge and/or Skills

- ◆ Non-specific immune system.
- ◆ Specific immune system.

#### Evidence Requirements

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

- ◆ describe the main components of the non-specific immune system
- ◆ describe the main components of the specific immune system

### Outcome 3

Investigate the relationship between exercise and the immune system.

#### Knowledge and/or Skills

- ◆ The effect of exercise on elements of the human immune system and susceptibility to infection.

#### Evidence Requirements

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

- ◆ investigate the relationship between exercise and susceptibility to disease
- ◆ investigate the effect of exercise on elements of the immune system

## Higher National Unit specification: support notes

### Unit title: Sports Science: Microbiology and Immunology

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

This Unit is intended to provide knowledge of microbiology and the human immune system that will help to prepare candidates articulating to courses such as Sport Nutrition, Human Health or Physiotherapy or who propose to pursue a career in a sport or health related area. Centres should aim to relate the underpinning knowledge to applications in the field of Sport and Exercise.

### 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 the range of micro-organisms which exists and the methods used to control micro-organisms and the range of defences provided by the human immune system. This Unit will provide knowledge essential to the understanding of subsequent microbiological and immunological studies by candidates and in the part played by microorganisms and the immune system in maintenance of human health.

**Outcome 1** looks at the structure and growth of the major microbial groups:

- ◆ Bacteria
- ◆ Fungi
- ◆ Protists
- ◆ Viruses and prions
- ◆ Growth curve: growth phases; doubling time;
- ◆ Factors which influence growth: temperature; pH;  $A_w$ ; nutrients;  $O_2$  concentration
- ◆ Physical and chemical methods used in control of growth, eg temperature, disinfection, filtration.

**Outcome 2** looks at the major components of the human immune system.

- ◆ The main components of the non-specific (innate) immune system should include barriers such as skin, mucus membranes, ciliated epithelium, pH and macrophages.
- ◆ The main components of the specific (acquired) immune system should include the production of antibodies, artificially acquired and naturally acquired immunity

**Outcome 3** investigates the influence exercise has on the immune system. Candidates may research the relationship moderate exercise has on health and/or the effect of training on the immune system of high performance athletes. Candidates working with individuals on a training regime may undertake an investigation into the secretion of IgA antibodies related to training.

## Higher National Unit specification: support notes (cont)

**Unit title:** Sports Science: Microbiology and Immunology

### Assessment Guidelines

#### Outcome 1

Evidence should be gathered using a written/oral questions under closed-book conditions. The questions should cover all the knowledge and skills in Outcome 1.

#### Outcome 2

Evidence should be gathered using a written/oral questions under closed-book conditions. The questions should cover all the knowledge and skills in Outcome 2.

#### Outcome 3

The candidate should submit a report, of approximately 1,000 words, based on an investigation into the effect of exercise on the immune system and the susceptibility to disease. Where appropriate this could be based on a practical activity or research based.

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

Outcome 3 should be a project based assessment with a submission of approximately 1,000 words. Candidates must meet the level of performance specified in the Evidence Requirements for all three Outcomes to achieve the Unit.

### 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.

### 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 Outcome 3 investigation.

### 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](http://www.sqa.org.uk/assessmentarrangements)

## History of changes to Unit

| Version | Description of change | Date |
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## General information for candidates

### **Unit title:** Sports Science: Microbiology and Immunology

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 range of micro-organisms which may have an impact on health and wellbeing. You will look at methods used to control micro-organisms and the range of defences provided by the human immune system. By the end of this Unit you should have a range of knowledge with which to underpin subsequent microbiological and immunological studies and an understanding of the part played by microorganisms and the immune system in maintenance of human health.

Outcome 1 will look at the range of microorganisms and factors affecting their growth. This will be assessed by means of a holistic assessment under closed-book supervised conditions with a 60% cut off score. Outcome 1 and Outcome 2 may be assessed together.

Outcome 2 will investigate the human immune system from the barriers designed to prevent entry of microorganisms, the immediate response by the body to invasion by microorganisms and the production of antibodies to specific organisms.

This will be assessed by means of a holistic assessment under closed-book supervised conditions with a 60% cut off score. Outcome 1 and Outcome 2 may be assessed together.

Outcome 3 is designed to provide you with the opportunity to research the relationship between exercise and the ability to fight off infection.

You will be assessed by means of a report on your investigation of approximately 1,000 words.