



Higher National Unit specification

General information for centres

Unit title: Applied Anatomy

Unit code: F4S2 34

Unit purpose: This Unit is designed to provide the candidate with a good working knowledge of human anatomy. The Unit provides underpinning knowledge for the more technical Units. This Unit includes competences and scope of practice as specified by the Society of Sports Therapists.

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

- 1 Perform applied and surface anatomy procedures on a human body.
- 2 Describe the structure and function of bone.
- 3 Explain the relationship between joint structures and movement.
- 4 Describe the structure and function of skeletal muscle.
- 5 Describe major muscles by position, origin, insertion and action.

Credit points and level: 1.5 HN credit at SCQF level 7: (12 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.*

Recommended prior knowledge and skills: It is recommended that candidates have knowledge of human anatomy from Higher Human Biology at SCQF level 6 or equivalent. 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. This Unit has been signposted for *Communication* at SCQF level 6, written communication (produce well structured written communication on a complex topic), *Information Technology* at SCQF level 5 (use an IT system effectively and responsibly to process a range of information) and *Numeracy* at SCQF level 5 (using numbers).

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 is a mandatory Unit in the framework of the HNC/HND Sports Therapy Group Award and should be taught at the beginning of year one.

General information for centres (cont)

Assessment: Outcome 1 will be assessed by direct observation of practical skills recorded on a lecturer checklist. Outcomes 2 and 4 will be assessed by open-book extended response report. Outcomes 3 and 5 will be assessed by closed-book restricted response.

There is an opportunity to integrate assessments for Outcomes 3 and 5.

Higher National Unit specification: statement of standards

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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

Perform applied and surface anatomy procedures on a human body

Knowledge and/or Skills

- ◆ Location of bones and superficial, palpable bony points
- ◆ Location of superficial muscles/tendons
- ◆ Location and demonstrate contractions of superficial muscles

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can correctly identify a minimum of 15 bony points and five superficial tendons and locate and demonstrate a contraction of a minimum of 10 muscles sampled from the full range of knowledge and skills. Candidates will be assessed by direct observation of practical skills recorded on an assessor's checklist.

- ◆ locate and identify the main bones of the skeleton:
 - skull
 - spine (cervical, thoracic, lumbar, sacrum, coccyx)
 - clavicle
 - scapula
 - sternum
 - ribs
 - humerus
 - radius
 - ulna
 - carpals
 - metacarpals
 - phalanges
 - tarsals
 - pelvis (ilium, ischium, pubis)
 - femur
 - patella
 - tibia
 - fibula

Higher National Unit specification: statement of standards (cont)

Unit title: Applied Anatomy

- ◆ locate and palpate superficial bony points:
 - occipital protuberance
 - spinous processes
 - scapula — acromion and coracoid processes
 - superior and inferior angles
 - medial border and spine
 - sternum — manubrium
 - body and xiphoid process
 - humerus — greater tubercle,
 - medial and lateral epicondyles
 - ulna — olecranon and styloid process
 - radius — head and styloid process
 - heads of metacarpals, pelvis — iliac crest
 - ASIS (anterior, superior iliac spine)
 - ischial tuberosity
 - femur — greater trochanter
 - medial and lateral epicondyles
 - tibia — medial and lateral condyles
 - tibial tuberosity
 - anterior border
 - medial malleolus
 - fibula — lateral malleolus
 - metatarsals — heads
 - base of 5th and tubercle of navicular
- ◆ locate superficial tendons:
 - supraspinatus
 - pectoralis major
 - latissimus dorsi
 - biceps
 - biceps femoris
 - semitendinosus patellar tendon
 - tibialis anterior
 - tibialis posterior
 - peroneus longus
 - tendo achilles'
- ◆ locate and demonstrate a contraction of superficial muscles:
 - trapezius — upper and middle fibres
 - latissimus dorsi
 - deltoid — anterior
 - middle and posterior fibres
 - pectoralis major — sternal and clavicular fibres
 - supraspinatus
 - infraspinatus
 - biceps
 - triceps
 - forearm flexors and extensors
 - hypo and thenar-eminence
 - rectus abdominus

Higher National Unit specification: statement of standards (cont)

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- external obliques
- erector spinae
- gluteus maximus
- gluteus medius
- TFL (tensor fascia lata)
- sartorius, hamstrings — biceps femoris
- Semi tendinous/membranosus
- quadriceps rectus femoris, vastus lateralis, vastus medialis, adductors, tibialis anterior peronii and gastrocnemius, soleus

Assessment Guidelines

Candidates will need performance evidence to demonstrate their knowledge and/or skills by showing that they can correctly identify a minimum of 15 bony points and five superficial tendons and locate and demonstrate a contraction of a minimum of 10 muscles sampled from the full range of knowledge and skills.

Candidates will be assessed by direct or video observation using an assessor checklist. A random sample of all skills sections will be selected for assessment. The candidate will be required to demonstrate skills and knowledge on a live model for all except location of bones, in this instance an anatomical model/skeleton can be used.

Outcome 2

Describe the structure and function of bone

Knowledge and/or Skills

- ◆ Functions of the skeleton
- ◆ Classification of bone
- ◆ Bone structure — gross and microstructure of long bone
- ◆ Ossification and maturation of long bones
- ◆ Positive and negative factors affecting bone health

Evidence Requirements

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

- ◆ describe the functions of the skeleton — rigidity/support/shape, production and storage of red blood cells (RBC) and white blood cells (WBC), calcium control, muscle attachments, leverage/movement system, protection
- ◆ describe the classification of bones — long/short/flat/irregular/sesamoid bones
- ◆ describe the gross and microstructure of long bone — epiphysis, metaphysis, diaphysis, medullary cavity, epiphyseal plates, periosteum, endosteum osteo-blasts, osteo-clasts, osteocytes. Cancellous/compact bone, haversian system

Higher National Unit specification: statement of standards (cont)

Unit title: Applied Anatomy

- ◆ describe the process of ossification, growth and maturation of a long bone — primary/secondary sites of ossification, role of epiphyseal plates, maturational timescales, appositional growth
- ◆ describe the factors influencing bone health — metabolic, endocrine and mechanical factors

This will be evidenced by an extended response report of approximately 2,000 words assessed under open-book conditions.

Assessment Guidelines

The assessment will be in the form of a research task with production of written/oral submission of approximately 2,000 words. This submission must cover all items listed under Evidence Requirements Opportunities should be made for appropriate research and resourcing prior to submission. Scientific report format should be used with clear referencing.

Outcome 3

Explain the relationship between joint structures and movement

Knowledge and/or Skills

- ◆ Classification of joints
- ◆ Structure and function of typical synovial joint
- ◆ Structure and movement patterns of major synovial joints
- ◆ Structure and movement patterns of the Vertebral Column
- ◆ Classification and movement of minor joints
- ◆ Factors affecting the range of movement at major synovial joints

Evidence Requirements

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

- ◆ identify classifications of joints: first class — fibrous, cartilaginous or synovial; second class — ball and socket, hinge, ellipsoid, (condyloid), planar, pivot, saddle
- ◆ describe the classification and movement patterns of the major synovial joints — hip, knee, ankle, sub talar, gleno humeral, elbow, wrist
- ◆ describe the structure of typical synovial joint — capsule, synovial membrane, synovial fluid, hyaline cartilage, extracapsular and intracapsular ligaments, fibrocartilage discs
- ◆ describe the functions of the components of a typical synovial joint
- ◆ describe, in detail, the structure of the major synovial joints — hip, knee, ankle/sub talar, gleno — humeral, elbow, wrist — bones, capsule, ligaments, fibrocartilage discs, bursae
- ◆ describe the structure and movement patterns of the vertebral column: regions — cervical, thoracic, lumbar, structure of a typical vertebrae, joints of body and arch, intervertebral disc structure and role in movement.
- ◆ describe the classification and movements of the minor synovial joints — atlanto — occipital, atlanto-axial, acromio — clavicular, sterno-clavicular, superior radio-ulnar, 1st carpo-metacarpal, carpometacarpal 2-5, metacarpal — phalangeal, interphalangeal, sacro iliac, superior tibio-fibular, tarso metatarsal, metatarsal phalangeal

Higher National Unit specification: statement of standards (cont)

Unit title: Applied Anatomy

- ◆ describe the factors limiting range of movement at normal synovial joints — soft tissue contact, soft tissue stretch, bony contact

This Outcome will be assessed by a restricted response question paper. The assessment should be closed-book under controlled conditions.

Assessment Guidelines

Candidates should be assessed using a closed-book restricted response question paper under supervised conditions laid out in sections with a marking scheme indicating a 70% pass rate for each section. Questions can be sampled from the full range of knowledge and skills. Candidates will have no prior knowledge of the areas to be assessed and a different sample will be used in each assessment instrument.

Outcome 4

Describe the structure and function of skeletal muscle

Knowledge and/or Skills

- ◆ Functions of skeletal muscle
- ◆ Properties of muscle tissue
- ◆ Structure of skeletal muscle
- ◆ Process of muscle contraction
- ◆ Types of muscle contraction and work
- ◆ Ranges of muscle action

Evidence Requirements

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

- ◆ describe the functions of skeletal muscles in relation to other body systems — temperature regulation, venous return, posture against gravity, movement
- ◆ describe the properties of skeletal muscles — elasticity, contractability, extensibility, excitability
- ◆ describe the gross and microstructure of skeletal muscle — epimysium, perimysium, endomysium, fasciculus, fibre, sarcomere arrangement, sarcoplasmic reticulum, T tubules
- ◆ describe the process of muscle contraction — depolarisation, repolarisation, calcium pump, sliding filament, contraction coupling mechanism

This will be evidenced by an extended response report of approximately 2,000 words assessed under open-book conditions.

Assessment Guidelines

Candidates will be assessed by open-book extended response using report format of approximately 2,000 words. Appropriate research and resourcing will be required prior to submission. Scientific report format should be used with clear referencing.

Higher National Unit specification: statement of standards (cont)

Unit title: Applied Anatomy

Outcome 5

Describe major muscles by position, origin, insertion and action

Knowledge and/or Skills

- ◆ Major muscles by position
- ◆ Major muscles by origin and insertion
- ◆ Major muscle actions at major joints

Evidence Requirements

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

- ◆ Describe major muscles by position:
 - Hip: pectineus, gluteus maximus/medius/minimus, psoas major, iliacus, tensor fascia lata, gracilis, adductor magnus/longus/brevis, sartorius
 - Knee: quadriceps-rectus femoris, vastus medialis, lateralis and intermedius hamstrings — biceps, femoris, semi tendonosis, semi membranosis, popliteus
 - Ankle: gastrocnemius, soleus, tibialis anterior, tibialis posterior, peroneii
 - Shoulder Joint and Girdle: deltoid, latissimus dorsi, pectoralis major, teres major, rotator cuff-supra spinatus, infraspinatus, teres minor, subscapularis, trapezius, rhomboids, serratus anterior
 - Elbow: biceps, brachialis, brachioradialis, triceps
 - Trunk: erector spinae, external oblique/internal oblique, rectus abdominus, multifidus, quadratus lumborum
- ◆ Describe major muscles by origin and insertion:
 - Hip: pectineus, gluteus maximus/medius/minimus, psoas major, iliacus, tensor fascia lata, gracilis, adductor magnus/longus/brevis, sartorius
 - Knee: quadriceps-rectus femoris, vastus medialis, lateralis and intermedius hamstrings — biceps, femoris, semi tendonosis, semi membranosis, popliteus
 - Ankle: gastrocnemius, soleus, tibialis anterior, tibialis posterior, peroneii
 - Shoulder Joint and Girdle: deltoid, latissimus dorsi, pectoralis major, teres major, rotator cuff-supra spinatus, infraspinatus, teres minor, subscapularis, trapezius, rhomboids, serratus anterior
 - Elbow: biceps, brachialis, brachioradialis, triceps
 - Trunk: erector spinae, external oblique/internal oblique, rectus abdominus, multifidus, quadratus lumborum
- ◆ Describe major muscles by prime action:
 - Hip: pectineus, gluteus maximus/medius/minimus, psoas major, iliacus, tensor fascia lata, gracilis, adductor magnus/longus/brevis, sartorius
 - Knee: quadriceps-rectus femoris, vastus medialis, lateralis and intermedius hamstrings — biceps, femoris, semi tendonosis, semi membranosis, popliteus
 - Ankle: gastrocnemius, soleus, tibialis anterior, tibialis posterior, peroneii
 - Shoulder Joint and Girdle: deltoid, latissimus dorsi, pectoralis major, teres major, rotator cuff-supra spinatus, infraspinatus, teres minor, subscapularis, trapezius, rhomboids, serratus anterior

Higher National Unit specification: statement of standards (cont)

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- Elbow: biceps, brachialis, brachioradialis, triceps
- Trunk: erector spinae, external oblique/internal oblique, rectus abdominus, multifidus, quadratus lumborum

This will be assessed by restricted response questions under closed-book controlled conditions.

Assessment Guidelines

Written and/or oral evidence (with evidence recorded by audio or checklist) gathered by closed-book restricted response questions.

The candidate will be required to describe a minimum of 12 muscles by position, attachments and action to include two from each of the following areas: hip region, knee region, ankle and foot, shoulder complex, elbow and forearm, spine/trunk sampled from the full range of knowledge and skills. The candidate will have no prior knowledge of the sample to be assessed and a different sample will be used in each assessment instrument.

Administrative Information

Unit code:	F4S2 34
Unit title:	Applied Anatomy
Superclass category:	RH
Original date of publication:	August 2008
Version:	02 (June 2009)

History of changes:

Version	Description of change	Date
01	Replaces Unit DP62 34 as of July 2008.	08/10/08
02	Changes made to standardise assessment guidelines.	03/06/09

Source: SQA

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Higher National Unit specification: support notes

Unit title: Applied Anatomy

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 60 hours.

Guidance on the content and context for this Unit

Outcome 1

Surface anatomy is detailed in Outcome 1 Knowledge and/or Skills.

Outcome 2

Describe the following:

- ◆ skeleton functions: rigidity/support/shape, production and storage of RBCs, WBCs, calcium control, muscle attachments, leverage/movement system, protection
- ◆ cancellous/compact bone, long/short/flat/irregular/sesamoid bones
- ◆ epiphyses, metaphysis, diaphysis, medullary cavity, epiphyseal plates, periosteum, endosteum osteo-blasts, osteo-clasts, osteo-cytes — functions and location, haversian systems — lamellae, lacunae, canaliculi, nutrient foramen
- ◆ primary/secondary sites of ossification in the long bone, embryonic diaphysis, cartilage model, periosteal collar, proliferation, formation of medullary cavity, role of epiphyseal plates in appositional growth, maturational timescales- pre natal, birth and final ossification of epiphyseal plates
- ◆ factors influencing bone health- endocrine — growth hormone, oestrogen, calcitrol age factors — adolescent bone and post menopausal
- ◆ metabolic — balance in the diet; calcium, Vitamin D, C, sunlight; mechanical- exercise and activity, bone loading, high and repetitive training loads, resisted exercise, weight bearing exercise

Outcome 3

- ◆ describe the shape and movement allowed in each type/classification of joint
- ◆ describe the bone shapes, and movements allowed in sub-types of synovial joints
- ◆ explain the function of synovial structures; joint capsule, synovial membrane, fluid and cavity, intra/extra capsular ligaments, hyaline cartilage, tendons, menisci, bursae
- ◆ major joints are described in the bones involved, sub-type, movements available, muscles responsible: shoulder, elbow, wrist, spine, hip, knee, ankle, vertebral column
- ◆ minor joints are identified in their sub-types: atlanto-occipital, atlanto-axial, acromio-clavicular, sterno-clavicular, proximal and distal radio-ulnar, meta-carpal/tarsal-carpal/tarsal, inter-phalangeal, sacro-iliac, pubis-symphysis, sub-talar

Examples of factors which negatively affect the range of motion in joints are identified: hyaline cartilage, synovial fluid, ligaments/capsule/skin/muscle tension, soft tissue contact, muscle weakness, osteo-/rheumatoid-arthritis.

Higher National Unit specification: support notes (cont)

Unit title: Applied Anatomy

Outcome 4

- ◆ functions of skeletal muscle: temperature regulation, venous return, posture against gravity, movement
- ◆ properties of muscle tissue: elasticity, contractibility, extensibility, excitability
- ◆ structure of skeletal muscle: epimysium, perimysium, endomysium, fasiculus, fibre, sarcomere arrangement, sarcoplasmic reticulum, T tubules
- ◆ muscle contraction: depolarisation, repolarisation, calcium pump sliding filament, contraction coupling mechanism

Outcome 5

Major muscles by position, origin, insertion and action are clearly detailed in Outcome 5 knowledge and/or skills.

Guidance on the delivery and assessment of this Unit

Outcome 1 identifies superficial bones, joints and muscles of the body in preparation for deeper investigation of the human anatomy. This Outcome should be learned through theory and practical application, enhancing understanding and practical skills of the candidate. This Outcome should be taught first in the Unit.

Outcomes 2 and 4 may be assessed as an assignment using online and flexible learning tools. Learning is enhanced by investigation and research.

Outcomes 3 and 5 can be taught by body area, ie ankle joint and muscles surrounding it, movements involved etc. This is one of the most important Outcomes of this Unit and may require extra study time to complete successfully. There is an opportunity to use an integrated assessment instrument.

Opportunities for developing Core Skills

This Unit has been signposted for *Communication* at SCQF level 6, written communication (produce well structured written communication on a complex topic), *Information Technology* at SCQF level 5 (use an IT system effectively and responsibly to process a range of information) and *Numeracy* at SCQF level 5 (using numbers).

Open learning

The underpinning knowledge for this Unit could be delivered by open learning with suitable support materials. The practical assessment skills however will require to be undertaken on live model in clinical environment. The candidate would be required to attend the centre for assessment opportunities requiring supervision.

Higher National Unit specification: support notes (cont)

Unit title: Applied Anatomy

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

General information for candidates

Unit title: Applied Anatomy

This Unit introduced you to the superficial and deeper anatomy of the human body required by the sports therapist to perform clinical assessment techniques.

The Unit provides the basic knowledge required to progress onto other mandatory and optional Units within the framework of the HNC/D Sports Therapy Group Award and is essential in the understanding of human movement.

There are many good anatomy and physiology textbooks and websites available for reference. Some resources you may find useful are:

Palastanga N., Field D., Soames R., (2000), *Anatomy and Human Movement, Structure and Function*, Butterworth-Heinemann.

Thibodeau G.A., Patton K.T., (1999), *Anatomy and Physiology*, Mosby.

Stone R.J., Stone J.A., (1990), *Atlas of the Skeletal Muscles*, Wm. C. Brown.

Jarmey C., (2003), *The Concise Book of Muscles*, Lotus Publishing.