Course content

The course content includes the following areas of human biology:

Human cells

The key areas covered are:

- division and differentiation in human cells
- structure and replication of DNA
- gene expression
- mutations
- human genomics
- metabolic pathways
- cellular respiration
- energy systems in muscle cells

Physiology and health

The key areas covered are:

- gamete production and fertilisation
- hormonal control of reproduction
- the biology of controlling fertility
- antenatal and postnatal screening
- the structure and function of arteries, capillaries and veins
- the structure and function of the heart
- pathology of cardiovascular disease (CVD)
- blood glucose levels and obesity

Neurobiology and immunology

The key areas covered are:

- divisions of the nervous system and neural pathways
- the cerebral cortex
- memory
- the cells of the nervous system and neurotransmitters at synapses
- non-specific body defences
- specific cellular defences against pathogens
- immunisation
- clinical trials of vaccines and drugs

Skills, knowledge and understanding

Skills, knowledge and understanding for the course

The following provides a broad overview of the subject skills, knowledge and understanding developed in the course:

- demonstrating knowledge and understanding of human biology by making accurate statements, describing information, providing explanations and integrating knowledge
- applying human biology knowledge to new situations, analysing information and solving problems
- planning and designing experiments/practical investigations to test given hypotheses or to illustrate particular effects
- carrying out experiments/practical investigations safely, recording detailed observations and collecting data
- selecting information from a variety of sources
- presenting information appropriately in a variety of forms
- processing information (using calculations and units, where appropriate)
- making predictions and generalisations from evidence/information
- drawing valid conclusions and giving explanations supported by evidence/justification
- evaluating experiments/practical investigations and suggesting improvements
- communicating findings/information effectively

Skills, knowledge and understanding for the course assessment

The following table provides details of skills, knowledge and understanding sampled in the course assessment.

The course support notes provide further detail on the depth of knowledge required for each key area of the course.

The key areas of the course, the apparatus and techniques noted below, and the depth of knowledge required for each key area noted in the course support notes can be assessed in the question paper.

Human cells
1 Division and differentiation in human cells
(a) Division of somatic and germline cells. Somatic stem cells divide by mitosis to form more somatic cells. Germline stem cells divide by mitosis and by meiosis. Division by mitosis produces more germline stem cells. Division by meiosis produces haploid gametes.
(b) Cellular differentiation Cellular differentiation is the process by which a cell expresses certain genes to produce proteins characteristic for that type of cell. This allows a cell to carry out specialised functions. Embryonic and tissue stem cells. Cells in the very early embryo can differentiate into all the cell types that make up the individual and so are pluripotent. Tissue stem cells are involved in the growth, repair and renewal of the cells found in that tissue. They are multipotent.
(c) Therapeutic and research uses of stem cells. Therapeutic uses involve the repair of damaged or diseased organs or tissues. Research uses involve stem cells being used as model cells to study how diseases develop or being used for drug testing. The ethical issues of using embryonic stem cells.
(d) Cancer cells divide excessively because they do not respond to regulatory signals. This results in a mass of abnormal cells called a tumour. Cells within the tumour may fail to attach to each other, spreading through the body where they may form secondary tumours.

Human cells
2 Structure and replication of DNA
(a) Structure of DNA — nucleotides (deoxyribose sugar, phosphate and base), sugar–phosphate backbone, base pairing (adenine–thymine and guanine–cytosine) by hydrogen bonds and double stranded antiparallel structure, with deoxyribose and phosphate at 3' and 5' ends of each strand respectively, forming a double helix.
(b) Replication of DNA by DNA polymerase and primers. DNA polymerase adds DNA nucleotides, using complementary base pairing, to the deoxyribose (3') end of the new DNA strand which is forming. Fragments of DNA are joined together by ligase.
(c) Polymerase chain reaction (PCR) amplifies DNA using complementary primers for specific target sequences. Repeated cycles of heating and cooling amplify the target region of DNA. Practical applications of PCR.
3 Gene expression
(a) Gene expression involves the transcription and translation of DNA sequences. Transcription and translation involves three types of RNA (mRNA, tRNA and rRNA). Messenger RNA (mRNA) carries a copy of the DNA code from the nucleus to the ribosome. Transfer RNA (tRNA) folds due to complementary base pairing. Each tRNA molecule carries its specific amino acid to the ribosome. Ribosomal RNA (rRNA) and proteins form the ribosome.
(b) The role of RNA polymerase in transcription of DNA into primary mRNA transcripts. RNA splicing forms a mature mRNA transcript. The introns of the primary transcript are non-coding regions and are removed. The exons are coding regions and are joined together to form the mature transcript.
(c) tRNA is involved in the translation of mRNA into a polypeptide at a ribosome. Translation begins at a start codon and ends at a stop codon. Anticodons bond to codons by complementary base pairing, translating the genetic code into a sequence of amino acids. Peptide bonds join the amino acids together. Each tRNA then leaves the ribosome as the polypeptide is formed.

Human cells
3 Gene expression
(d) Different proteins can be expressed from one gene, as a result of alternative RNA splicing. Different mature mRNA transcripts are produced from the same primary transcript depending on which exons are retained.
(e) Amino acids are linked by peptide bonds to form polypeptides. Polypeptide chains fold to form the three-dimensional shape of a protein, held together by hydrogen bonds and other interactions between individual amino acids. Proteins have a large variety of shapes which determines their functions. Phenotype is determined by proteins produced as the result of gene expression.
4 Mutations
(a) Mutations are changes in the DNA that can result in no protein or an altered protein being synthesised.
(b) Single gene mutations involve the alteration of a DNA nucleotide sequence as a result of the substitution, insertion or deletion of nucleotides. Nucleotide substitutions — missense, nonsense and splice-site mutations. Nucleotide insertions or deletions result in frame-shift mutations.
(c) Chromosome structure mutations — duplication, deletion, inversion and translocation. The substantial changes in chromosome mutations often make them lethal.
5 Human genomics
(a) The genome of an organism is its entire hereditary information encoded in DNA. A genome is made up of genes and other DNA sequences that do not code for proteins. In genomic sequencing the sequence of nucleotide bases can be determined for individual genes and entire genomes.
(b) An individual's genome can be analysed to predict the likelihood of developing certain diseases. Pharmacogenetics and personalised medicine.

Human cells

6 Metabolic pathways

(a) Metabolic pathways are integrated and controlled pathways of enzyme-catalysed reactions within a cell.

Metabolic pathways can have reversible steps, irreversible steps and alternative routes.

Reactions within metabolic pathways can be anabolic or catabolic. Anabolic reactions build up large molecules from small molecules and require energy. Catabolic reactions break down large molecules into smaller molecules and release energy.

(b) Metabolic pathways are controlled by the presence or absence of particular enzymes and the regulation of the rate of reaction of key enzymes.

Induced fit and the role of the active site of an enzyme in affecting activation energy and the affinity of the substrate and products for the active site.

The effects of substrate and product concentration on the direction and rate of enzyme reactions.

Control of metabolic pathways through competitive, non-competitive and feedback inhibition of enzymes.

7 Cellular respiration

(a) Metabolic pathways of cellular respiration.

Glycolysis is the breakdown of glucose to pyruvate in the cytoplasm.

ATP is required for the phosphorylation of glucose and intermediates during the energy investment phase of glycolysis. This leads to the generation of more ATP during the energy pay-off stage and results in a net gain of ATP. In aerobic conditions pyruvate is broken down to an acetyl group that combines with coenzyme A forming acetyl coenzyme A.

In the citric acid cycle the acetyl group from acetyl coenzyme A combines with oxaloacetate to form citrate. During a series of enzyme-controlled steps, citrate is gradually converted back into oxaloacetate which results in the generation of ATP and release of carbon dioxide.

The citric acid cycle occurs in the matrix of the mitochondria.

Dehydrogenase enzymes remove hydrogen ions and electrons and pass them to the coenzyme NAD, forming NADH. This occurs in both glycolysis and the citric acid cycle.

The hydrogen ions and electrons from NADH are passed to the electron transport chain on the inner mitochondrial membrane.

Human cells
7 Cellular respiration
(b) ATP synthesis — electrons are passed along the electron transport chain releasing energy. This energy allows hydrogen ions to be pumped across the inner mitochondrial membrane. The flow of these ions back through the membrane protein ATP synthase results in the production of ATP. Finally, hydrogen ions and electrons combine with oxygen to form water.
(c) The role of ATP in the transfer of energy.
8 Energy systems in muscle cells
(a) Lactate metabolism During vigorous exercise, the muscle cells do not get sufficient oxygen to support the electron transport chain. Under these conditions, pyruvate is converted to lactate. This conversion involves the transfer of hydrogen ions from the NADH produced during glycolysis to pyruvate in order to produce lactate. This regenerates the NAD needed to maintain ATP production through glycolysis. Lactate accumulates and muscle fatigue occurs. The oxygen debt is repaid when exercise is complete. This allows respiration to provide the energy to convert lactate back to pyruvate and glucose in the liver.
(b) Types of skeletal muscle fibres Slow-twitch muscle fibres contract relatively slowly, but can sustain contractions for longer. They are useful for endurance activities such as long-distance running, cycling or cross-country skiing. Fast-twitch muscle fibres contract relatively quickly, over short periods. They are useful for activities such as sprinting or weightlifting. Most human muscle tissue contains a mixture of both slow- and fast-twitch muscle fibres. Athletes show distinct patterns of muscle fibres that reflect their sporting activities.

Physiology and health
1 Gamete production and fertilisation
(a) Gamete production in the testes Testes produce sperm in the seminiferous tubules and testosterone in the interstitial cells. The prostate gland and seminal vesicles secrete fluids that maintain the mobility and viability of the sperm.
(b) Gamete production in the ovaries The ovaries contain immature ova in various stages of development. Each ovum is surrounded by a follicle that protects the developing ovum and secretes hormones.
(c) Fertilisation Mature ova are released into the oviduct where they may be fertilised by sperm to form a zygote.
2 Hormonal control of reproduction
(a) Hormonal influence on puberty.
(b) Hormonal control of sperm production.
(c) Hormonal control of the menstrual cycle The menstrual cycle takes approximately 28 days with the first day of menstruation regarded as day one of the cycle. FSH stimulates the development of a follicle and the production of oestrogen by the follicle in the follicular phase. Oestrogen stimulates proliferation of the endometrium preparing it for implantation, and affects the consistency of cervical mucus making it more easily penetrated by sperm. Peak levels of oestrogen stimulate a surge in the secretion of LH. This surge in LH triggers ovulation. In the luteal phase the follicle develops into a corpus luteum which secretes progesterone. Progesterone promotes further development and vascularisation of the endometrium preparing it for implantation if fertilisation occurs. The negative feedback effect of the ovarian hormones on the pituitary gland and the secretion of FSH and LH prevent further follicles from developing. The lack of LH leads to degeneration of the corpus luteum with a subsequent drop in progesterone levels leading to menstruation.

Physiology and health
3 The biology of controlling fertility
Infertility treatments and contraception are based on the biology of fertility. (a) Women show cyclical fertility leading to a fertile period. Men show continuous fertility. Identification of the fertile period.
(b) Treatments for infertility Stimulating ovulation Ovulation is stimulated by drugs that prevent the negative feedback effect of oestrogen on FSH secretion. Other ovulatory drugs mimic the action of FSH and LH. These drugs can cause super ovulation that can result in multiple births or be used to collect ova for in vitro fertilisation (IVF) programmes. Artificial insemination Several samples of semen are collected over a period of time. Artificial insemination is particularly useful where the male has a low sperm count. If a partner is sterile a donor may be used to provide semen. Intra-cytoplasmic sperm injection (ICSI) If mature sperm are defective or very low in number, ICSI can be used. The head of the sperm is drawn into a needle and injected directly into the egg to achieve fertilisation. In vitro fertilisation (IVF) Surgical removal of eggs from ovaries after hormone stimulation. Incubation of zygotes and uterine implantation. The use of IVF in conjunction with pre-implantation genetic diagnosis (PGD) to identify single gene disorders and chromosomal abnormalities.
(c) Physical and chemical methods of contraception. Biological basis of physical methods used to prevent pregnancy. The oral contraceptive pill is a chemical method of contraception. It contains a combination of synthetic oestrogen and progesterone that mimics negative feedback preventing the release of FSH and LH from the pituitary gland. The progesterone-only (mini) pill causes thickening of the cervical mucus. Emergency hormonal contraceptive pills prevent or delay ovulation.

Physiology and health
4 Antenatal and postnatal screening
A variety of techniques can be used to monitor the health of the mother, developing fetus and baby. (a) Antenatal screening Antenatal screening identifies the risk of a disorder so that further tests and a prenatal diagnosis can be offered. Ultrasound imaging Pregnant women are given two ultrasound scans. Dating scans which determine pregnancy stage and due date are used with tests for marker chemicals which vary normally during pregnancy. Anomaly scans may detect serious physical abnormalities in the fetus. Blood and urine tests Routine blood and urine tests are carried out throughout pregnancy to monitor the concentrations of marker chemicals. Diagnostic testing Amniocentesis and chorionic villus sampling (CVS) and the advantages and disadvantages of their use. Cells from samples can be cultured to obtain sufficient cells to produce a karyotype to diagnose a range of conditions.
(b) Analysis of patterns of inheritance in genetic screening and counselling. Patterns of inheritance in autosomal recessive, autosomal dominant, incomplete dominance and sex-linked recessive single gene disorders.
(c) Postnatal screening. Diagnostic testing for phenylketonuria (PKU). In PKU a substitution mutation means that the enzyme which converts phenylalanine to tyrosine is non-functional.

Physiology and health
5 The structure and function of arteries, capillaries and veins
(a) Blood circulates from the heart through the arteries to the capillaries then to the veins and back to the heart. There is a decrease in blood pressure as blood moves away from the heart.
(b) The structure and function of arteries, capillaries and veins: endothelium, central lumen, connective tissue, elastic fibres, smooth muscle and valves. The role of vasoconstriction and vasodilation in controlling blood flow.
(c) The exchange of materials between tissue fluid and cells through pressure filtration and the role of lymphatic vessels. Tissue fluid and blood plasma are similar in composition with the exception of plasma proteins, which are too large to be filtered through the capillary walls.
6 The structure and function of the heart
Blood flow through the heart and its associated blood vessels. (a) Cardiac output and its calculation.
(b) The cardiac cycle. Functions of diastole, atrial systole and ventricular systole. Effect of pressure changes on atrio-ventricular (AV) and semi lunar (SL) valves.
(c) The structure and function of the cardiac conducting system. Control of contraction and timing by cells of the sino-atrial node (SAN) and transmission to the atrio-ventricular node (AVN). Impulses in the heart generate currents that can be detected by an electrocardiogram (ECG). The medulla regulates the rate of the sino-atrial node through the antagonistic action of the autonomic nervous system (ANS). A sympathetic nerve releases noradrenaline which increases the heart rate, whereas a parasympathetic nerve releases acetylcholine which decreases the heart rate.
(d) Blood pressure changes in the aorta during the cardiac cycle. Measurement of blood pressure using a sphygmomanometer. Hypertension (high blood pressure) is a major risk factor for many diseases including coronary heart disease.

Physiology and health
7 Pathology of cardiovascular disease (CVD)
(a) Process of atherosclerosis, its effect on arteries and blood pressure. Atherosclerosis is the root cause of various cardiovascular diseases (CVD) — angina, heart attack, stroke and peripheral vascular disease.
(b) Thrombosis — endothelium damage, clotting factors and the role of prothrombin, thrombin, fibrinogen and fibrin. Thrombus formation and the formation and effects of an embolus. A thrombosis in a coronary artery may lead to a myocardial infarction (MI), commonly known as a heart attack. A thrombosis in an artery in the brain may lead to a stroke. Cells are deprived of oxygen leading to death of the tissues.
(c) Causes and effects of peripheral vascular disorders. Peripheral vascular disease is narrowing of the arteries due to atherosclerosis of arteries other than those of the heart or brain. The arteries to the legs are most commonly affected. Pain is experienced in the leg muscles due to a limited supply of oxygen. A deep vein thrombosis (DVT) is a blood clot that forms in a deep vein, most commonly in the leg. This can break off and result in a pulmonary embolism in the lungs.
(d) Control of cholesterol levels in the body. Cholesterol is a type of lipid found in the cell membrane. It is also used to make the sex hormones — testosterone, oestrogen and progesterone. Cholesterol is synthesised by all cells, although 25% of total production takes place in the liver. A diet high in saturated fats or cholesterol causes an increase in cholesterol levels in the blood. Roles of high density lipoproteins (HDL) and low density lipoproteins (LDL). LDL receptors, negative feedback control and atheroma formation. Ratios of HDL to LDL in maintaining health. The benefits of physical activity and a low fat diet. Reducing blood cholesterol through prescribed medications.

Physiology and health
8 Blood glucose levels and obesity
(a) Chronic elevated blood glucose levels lead to atherosclerosis and blood vessel damage.
(b) Pancreatic receptors and the role of hormones in negative feedback control of blood glucose through insulin, glucagon and adrenaline.
(c) Type 1 and type 2 diabetes Type 1 diabetes usually occurs in childhood. A person with type 1 diabetes is unable to produce insulin and can be treated with regular doses of insulin. Type 2 diabetes typically develops later in life. The likelihood of developing type 2 diabetes is increased by being overweight. In type 2 diabetes, individuals produce insulin but their cells are less sensitive to it. This insulin resistance is linked to a decrease in the number of insulin receptors in the liver, leading to a failure to convert glucose to glycogen. In both types of diabetes, individual blood glucose concentrations will rise rapidly after a meal. The kidneys will remove some of this glucose resulting in glucose appearing in urine. The glucose tolerance test is used to diagnose diabetes.
(d) Obesity Obesity is a major risk factor for cardiovascular disease and type 2 diabetes. Obesity is characterised by excess body fat in relation to lean body tissue such as muscle. Obesity may impair health. Body mass index (BMI) is commonly used to measure obesity but can wrongly classify muscular individuals as obese. Role of diet and exercise in reducing obesity and cardiovascular disease (CVD).

Neurobiology and immunology
1 Divisions of the nervous system and neural pathways
(a) Structure of the central nervous system (CNS) and the peripheral nervous system (PNS). The somatic nervous system contains sensory and motor neurons. The autonomic nervous system (ANS) consists of the sympathetic and parasympathetic systems. The antagonistic actions of the sympathetic and parasympathetic systems on heart rate, breathing rate, peristalsis and intestinal secretions.
(b) Structure and function of converging, diverging and reverberating neural pathways.
2 The cerebral cortex
(a) The cerebral cortex is the centre of conscious thought. It also recalls memories and alters behaviour in the light of experience. There is localisation of brain functions in the cerebral cortex. It contains sensory areas, motor areas and association areas. There are association areas involved in language processing, personality, imagination and intelligence.
(b) Information from one side of the body is processed in the opposite side of the cerebrum. Transfer of information between the cerebral hemispheres occurs through the corpus callosum.
3 Memory
(a) Memory involves encoding storage and retrieval of information. All information entering the brain passes through sensory memory and enters short-term memory (STM). Information is then either transferred to long-term memory (LTM) or is discarded.
(b) Sensory memory retains all the visual and auditory input received for a few seconds.
(c) Short-term memory (STM) STM has a limited capacity and holds information for a short time. The capacity of STM can be improved by ‘chunking’. STM can also process data, to a limited extent, as well as store it. This ‘working memory model’ explains why the STM can perform simple cognitive tasks.
(d) Long-term memory (LTM) LTM has an unlimited capacity and holds information for a long time. The transfer of information from STM to LTM by rehearsal, organisation and elaboration. Retrieval is aided by the use of contextual cues.

Neurobiology and immunology
4 The cells of the nervous system and neurotransmitters at synapses
(a) Structure and function of neurons — dendrites, cell body and axons. Structure and function of myelin sheath. Myelination continues from birth to adolescence. Certain diseases destroy the myelin sheath causing a loss of co-ordination. Glial cells produce the myelin sheath and support neurons.
(b) Neurotransmitters at synapses. Chemical transmission at the synapse by neurotransmitters — vesicles, synaptic cleft and receptors. The need for removal of neurotransmitters by enzymes or reuptake to prevent continuous stimulation of postsynaptic neurons. Receptors determine whether the signal is excitatory or inhibitory. Synapses can filter out weak stimuli arising from insufficient secretion of neurotransmitters. Summation of a series of weak stimuli can release enough neurotransmitter to trigger an impulse.
(c) Neurotransmitter effects on mood and behaviour. The functions of endorphins. Endorphin production increases in response to severe injury, prolonged and continuous exercise, stress and certain foods. The function of dopamine.
(d) Neurotransmitter-related disorders and their treatment. Many drugs used to treat neurotransmitter-related disorders are agonists or antagonists. Other drugs act by inhibiting the enzymes that degrade neurotransmitters or by inhibiting reuptake of the neurotransmitter at the synapse causing an enhanced effect.

Neurobiology and immunology
4 The cells of the nervous system and neurotransmitters at synapses
(e) Mode of action of recreational drugs. Recreational drugs can also act as agonists or antagonists. Recreational drugs affect neurotransmission at synapses in the brain altering an individual's mood, cognition, perception and behaviour. Many recreational drugs affect neurotransmission in the reward pathway of the brain. Drug addiction is caused by repeated use of drugs that act as antagonists. Drug tolerance is caused by repeated use of drugs that act as agonists.
5 Non-specific body defences
(a) Physical and chemical defences. Epithelial cells form a physical barrier. Chemical secretions are produced against invading pathogens.
(b) The inflammatory response.
(c) Phagocytes Phagocytes recognise pathogens and destroy them by phagocytosis. Phagocytes release cytokines which attract more phagocytes to the site of infection.

Neurobiology and immunology

6 Specific cellular defences against pathogens

(a) Lymphocytes

Lymphocytes are the white blood cells involved in the specific immune response.

Lymphocytes respond to specific antigens on invading pathogens.

Antigens are molecules, often proteins located on the surface of cells that trigger a specific immune response.

There are two types of lymphocytes — B lymphocytes and T lymphocytes.

B lymphocytes produce antibodies against antigens and this leads to the destruction of the pathogen.

B lymphocytes can respond to antigens on substances that are harmless to the body, eg pollen. This hypersensitive response is called an allergic reaction.

T lymphocytes destroy infected body cells by recognising antigens of the pathogen on the cell membrane and inducing apoptosis. Apoptosis is programmed cell death.

T lymphocytes can normally distinguish between self-antigens on the body's own cells and non-self-antigens on infected cells.

Failure of the regulation of the immune system leads to T lymphocytes responding to self-antigens. This causes autoimmune diseases.

(b) Some of the cloned B and T lymphocytes survive long-term as memory cells. When a secondary exposure to the same antigen occurs, these memory cells rapidly give rise to a new clone of specific lymphocytes. These destroy the invading pathogens before the individual shows symptoms.

The human immunodeficiency virus (HIV) attacks and destroys T lymphocytes. HIV causes depletion of T lymphocytes which leads to the development of AIDS (acquired immune deficiency syndrome).

Neurobiology and immunology

7 Immunisation

(a) Vaccination

Immunity can be developed by vaccination using antigens from infectious pathogens, so creating memory cells.

Antigens are usually mixed with an adjuvant when producing the vaccine.

(b) Herd immunity

Herd immunity occurs when a large percentage of a population is immunised. Establishing herd immunity is important in reducing the spread of diseases.

Non-immune individuals are protected as there is a lower probability they will come into contact with infected individuals.

The herd immunity threshold depends on the type of disease, the effectiveness of the vaccine and the density of the population.

Mass vaccination programmes are designed to establish herd immunity to a disease.

Difficulties can arise when widespread vaccination is not possible due to poverty in the developing world, or when vaccines are rejected by a percentage of the population in the developed world.

(c) Antigenic variation

Some pathogens can change their antigens. This means that memory cells are not effective against them.

Role and impact of antigenic variation in influenza.

8 Clinical trials of vaccines and drugs

Vaccines and drugs are subjected to clinical trials to establish their safety and effectiveness before being licensed for use.

The design of clinical trials to test vaccines and drugs involves randomised, double-blind and placebo-controlled protocols.

The importance of group size in reducing experimental error and establishing statistical significance.

Apparatus and techniques

In addition to the key areas, candidates must have knowledge of the following pieces of apparatus and have opportunities to become familiar with the following techniques.

Apparatus
♦ beaker ♦ balance ♦ measuring cylinder ♦ dropper/pipette ♦ test tube/boiling tube ♦ thermometer ♦ funnel ♦ syringe ♦ timer/stopwatch ♦ Petri dish ♦ water bath ♦ colorimeter ♦ pulsometer ♦ sphygmomanometer
Techniques
♦ using gel electrophoresis to separate macromolecule, for example DNA fragments ♦ using substrate concentration or inhibitor concentration to alter reaction rates ♦ measuring metabolic rate using oxygen, carbon dioxide and temperature probes ♦ using a respirometer ♦ measuring pulse rate and blood pressure ♦ measuring body mass index The course support notes provide a list of suggested learning activities. Choosing from the activities suggested in the course support notes, or carrying out any other appropriate activities, allows candidates to become familiar with the apparatus and techniques listed above. Where it is not possible to carry out a particular technique other resources could be utilised.

Skills, knowledge and understanding included in the course are appropriate to the SCQF level of the course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level, and can be found on the SCQF website.