



# Year 12 Syllabus in a nutshell

A Level PE





## Year 12 Syllabus in a nutshell – A Level PE

### A+P (EP)

#### Subject content

##### Joints, movements and muscles

- shoulder:
  - flexion, extension, abduction, adduction, horizontal flexion/extension, medial and lateral rotation, circumduction
  - deltoid, latissimus dorsi, pectoralis major, trapezius, teres minor.
- elbow:
  - flexion, extension
  - biceps brachii, triceps brachii.
- wrist:
  - flexion, extension
  - wrist flexors, wrist extensors.
- hip:
  - flexion, extension, abduction, adduction, medial and lateral rotation
  - iliopsoas, gluteus maximus, medius and minimus, adductor longus, brevis and magnus.
- knee:
  - flexion, extension
  - hamstring group: biceps femoris, semi-membranosus, semi-tendinosus;
  - quadriceps group: rectus femoris, vastus lateralis, vastus intermedius and vastus medialis.
- ankle:
  - dorsi flexion, plantar flexion
  - tibialis anterior, soleus, gastrocnemius.

##### Planes of movement:

- Frontal
- Transverse
- Sagittal.

#### Functional roles of muscles and types of contraction

- roles of muscles including the agonist, antagonist and fixator.
- types of contraction including isotonic, concentric, eccentric and isometric.

#### Analysis of Movement

analyse movement with reference to:

- joint type
- movement produced
- agonist and antagonist muscles involved
- type of muscle contraction taking place.

**Skeletal muscle contraction**

- structure and role of motor units in skeletal muscle contraction
- nervous stimulation of the motor unit:
  - motor neuron
  - action potential
  - neurotransmitter
  - 'all or none' law.

**Muscle contraction during exercise of differing intensities and during recovery**

- muscle fibre types:
  - slow oxidative
  - fast oxidative glycolytic
  - fast glycolytic.
- recruitment of different fibre types during exercise of differing intensities and during recovery.

**Cardiovascular system at rest**

- the relationship between, and resting values for:
  - heart rate
  - stroke volume
  - cardiac output
  - methods of calculating the above.
- cardiac cycle:
  - diastole
  - systole.
- conduction system of the heart linked to the cardiac cycle.

**Cardiovascular system during exercise of differing intensities and during recovery**

The effects of different exercise intensities and recovery on:

- heart rate
- stroke volume
- cardiac output
- methods of calculating the above.

redistribution of cardiac output during exercise of differing intensities and during recovery:

- vascular shunt mechanism
- role of the vasomotor centre
- role of arterioles
- role of pre-capillary sphincters.

mechanisms of venous return during exercise of differing intensities and during recovery.

regulation of heart rate during exercise:

- neural factors



- hormonal factors
- intrinsic factors.

### **Respiratory system at rest**

- relationship between resting values for:
  - breathing frequency
  - tidal volume
  - minute ventilation
  - methods of calculating the above.
- mechanics of breathing at rest and the muscles involved:
  - diaphragm
  - external intercostals
  - at the alveoli
  - at the muscles.

### **Respiratory system during exercise of differing intensities and during recovery**

- effects of differing intensities of exercise and recovery on:
  - breathing frequency
  - tidal volume
  - minute ventilation.
- mechanics of breathing during exercise of differing intensities and during recovery, including additional muscles involved:
  - inspiration - sternocleidomastoid, pectoralis minor
  - expiration - internal intercostals, rectus abdominis.
- regulation of breathing during exercise of different intensities and during recovery
  - neural control
  - chemical control.
- effect of differing intensities of exercise and recovery on gas exchange at the alveoli and at the muscles
  - changes in pressure gradient
  - changes in dissociation of oxyhaemoglobin.

### **Adenosine triphosphate (ATP) and energy transfer**

- ATP as 'energy currency'
- principle of energetically coupled reactions:
  - breakdown of ATP to ADP (Adenosine Diphosphate) + P (phosphate)
  - resynthesis of ATP from ADP + P.

### **Energy Systems and ATP resynthesis**

- energy systems:
  - ATP-PC (Phosphocreatine) system
  - glycolytic system
  - aerobic system.
- for each system:
  - type of reaction (aerobic or anaerobic)
  - chemical or food fuel used
  - specific site of the reaction
  - controlling enzyme



- ATP yield
- specific stages within the system
- by-products.

### **ATP resynthesis during exercise of differing intensities and durations**

- the energy continuum
- predominant energy system used during exercise:
  - how intensity and duration of exercise influence which energy system is predominantly used to resynthesise ATP
  - interpretation of figures relating to the contribution of the three energy systems to exercise of different intensities and durations.

interplay of energy systems during intermittent exercise and factors that affect this interplay

- intensity of exercise
- duration of exercise
- recovery periods
- fitness levels.

### **The recovery process**

- How the body returns to its pre-exercise state: Excess Post exercise Oxygen Consumption (EPOC).
- fast components of EPOC, the processes that occur and the duration:
  - replenishment of blood and muscle oxygen stores,
  - re-synthesis of ATP and PC.
- slow components of EPOC, the processes that occur and the duration:
  - elevated circulation
  - elevated ventilation
  - elevated body temperature
  - lactate removal and conversion to glycogen.
- effect of exercise intensity on EPOC and implications of the recovery process for planning exercise or training sessions.

### **Exercise at altitude**

- effect of altitude on the cardiovascular and respiratory systems:
  - reduced arterial PO<sub>2</sub> (partial pressure of oxygen) leading to impaired muscle O<sub>2</sub> delivery
  - elevated heart rate and ventilation.
- acclimatisation, including the importance of timing arrival, at altitude (above 2400m)

### **Exercise in the heat**

- effect of heat on the cardiovascular and respiratory systems:
  - temperature regulation
  - cardiovascular drift.



### Acute and Chronic injuries

- acute injuries resulting from a sudden stress to the body:
  - hard tissue injuries
  - soft tissue injuries
  - concussion.
- chronic injuries resulting from continuous stress to the body:
  - soft tissue injuries
  - hard tissue injuries.

### Injury prevention

intrinsic risk factors:

- individual variables
- training effects.

extrinsic risk factors:

- poor technique / training
- incorrect equipment / clothing
- inappropriate intensity, duration or frequency of activity.

debate surrounding effective warm up and cool down.

### Responding to injuries and medical conditions in a sporting context

- assessing sporting injuries using 'SALTAPS' – See
  - Ask
  - Look
  - Touch
  - Active
  - Passive
  - Strength.
- acute management of soft tissue injuries using 'PRICE' – Protection
- Rest
- Ice
- Compression
- Elevation.

recognising concussion: IRB's 'Recognise and Remove' 6 R's – Recognise Remove –

- Reference
- Rest
- Recover
- Return



### Rehabilitation of injury

treatment of common sporting injuries:

- injuries: fractures – simple, stress
- joint injuries - dislocation, sprain, torn cartilage o exercise-induced muscle damage.

Treatments:

- stretching
- massage
- heat, cold and contrast therapies
- anti-inflammatory drugs
- physiotherapy
- surgery.

### A+P (VES)

#### Subject content

##### Aerobic Training

- Define aerobic capacity and maximal oxygen uptake
- To know how V02 max is affected by; individual physiological make-up, training, age and gender
- To know the methods of evaluating aerobic capacity including lab based testing of V02 max gas analysis, NCG Multistage fitness test, Queens college test and Cooper 12 minute run
- To describe how intensity and duration of training used will develop aerobic capacity for both continuous and High Intensity Interval Training (HIIT)
- To use target HR as an intensity guide
- To know the physiological adaptations from aerobic training for the cardiovascular, respiratory, muscular and metabolic systems
- Activities and sports in which aerobic capacity are a key fitness component

##### Strength Training

- To define different types of strength – Strength endurance, maximum strength, explosive/elastic strength and static and dynamic strength
- To know the factors affecting strength, fibre type and cross-sectional area of muscle
- TO know the methods of evaluating strength, including Grip Dynamometer, 1 rep max, press-up/sit up test and vertical jump test
- To understand how training develops strength including, reps, sets, resistance guidelines used to improve each type of strength, use of multi gyms, plyometrics and circuit/interval training.
- Within circuit training to know how work duration, intensity, relief intervals, and number of reliefs impact
- To know the physiological adaptations from strength training, including muscle and connective tissues, neural and metabolic systems.
- Activities and sports which strength is a key fitness component

##### Flexibility

- define flexibility (to include static and dynamic flexibility);
- demonstrate knowledge and understanding of factors that affect flexibility (type of joint; length of surrounding connective tissue);
- describe and apply methods of evaluating flexibility (e.g. sit and reach test; goniometer (angle measure));
- describe different types of training used to develop flexibility (including static (active and passive), dynamic, ballistic and proprioceptive neuromuscular facilitation (PNF)); explain the physiological adaptations that take place after prolonged periods of physical activity (to include physiological changes to skeletal muscle and connective tissue);



#### Impact on training

- the effect of training on lifestyle disease including cardiovascular; CHD, stroke, atherosclerosis and heart attack and respiratory disease; asthma and chronic obstructive pulmonary disease (COPD)

#### Application of the principles of training

• Periodisation - define periodisation; macro, meso and micro cycles;  
 plan a personal health and fitness programme that will promote sustained involvement in a balanced, active and healthy lifestyle; the plan should include the principles of training.

- To know phases of training – define preparatory, competitive, transition
- To know what and how an athlete tapers to optimise performance

#### Diet and Nutrition

- To know the function and importance of the components of a healthy, balanced diet including Carbohydrate, proteins, fats, mineral, vitamins, fibre and water
- To understand the energy intake and expenditure and the energy balance in physical activity and performance

#### Ergogenic Aids

- To know the types of ergogenic aid, the potential benefits and the potential risks to them
- Pharmacological aids include Anabolic steroids, erythropoietin (EPO) and Human growth hormone (HGH)
- Physiological aids include blood doping, intermittent hypoxic training (IHT) and cooling aids
- To know about nutritional aids, the amount, composition of meals, timing of meals and hydration
- To understand how glycogen loading/carbohydrate loading, creatine, caffeine, bicarbonate and nitrate can all benefit a performer.

## ACQUIRING MOVEMENT SKILLS (DHT)

### Subject content

#### Classification of skills

Justification of placement of skills on continua:

- difficulty (simple-complex)
- environmental influence (open-closed)
- pacing (self-paced-externally paced)
- muscular involvement (gross-fine)
- continuity (discrete-serial-continuous)
- organisation (low - high).

#### Types and methods of practice

Characteristics and uses of each:

- part practice
- whole practice
- whole-part-whole practice
- progressive-part practice
- massed practice





- distributed practice
- fixed practice
- varied practice.

### **Transfer of Skills**

- types of transfer including positive, negative, retroactive and bilateral
- to know and understand the ways of optimising the effect of positive transfer
- to know and understand the ways of limiting the effect of negative transfer.

### **Principles and theories of learning movement skills**

Theories of learning including operant conditioning, cognitive theory of learning and Bandura's theory of social/observational learning.

### **Stages of learning**

Characteristics of the stages of learning including the cognitive, associative autonomous stages.

### **Guidance**

- Types and uses of guidance:
  - verbal guidance
  - visual guidance
  - manual guidance
  - mechanical guidance.
- Advantages and disadvantages of using each type of guidance.

### **Feedback**

- types and uses of feedback:
  - intrinsic
  - extrinsic
  - positive
  - negative
  - knowledge of performance
  - knowledge of results.
- advantages and disadvantages of using each type of feedback.

### **Memory Models**

- Atkinson and Shiffrin's multi-store memory model - use of selective attention.
- Craik and Lockhart's levels of processing model.
- relate both models to learning and performing physical activity skills.



## **SOCIO - CULTURAL STUDIES**

### **1. Emergence & evolution of modern sport**

#### **How social and cultural factors shaped the characteristics of, and participation in, sports and pastimes in pre-industrial Britain:**

- social class
- gender
- law and order
- education/literacy
- availability of time
- availability of money
- type and availability of transport.

#### **How social and cultural factors shaped the characteristics of, and participation in, sport in post 1850 industrial Britain:**

- social class (amateurism and professionalism)
- gender/changing status of women
- law and order
- education/literacy
- availability of time / changing work conditions
- availability of money
- transport notably the railways
- Influence of public schools:
  - on the promotion and organisation of sports and games
  - on the promotion of ethics through sports and games
  - the 'cult' of athleticism – meaning, nature and impact
  - on the spread and export of games and the games ethic.

#### **How social factors shaped the characteristics of, and participation in, sport in 20th century Britain:**

- social class (amateurism & professionalism)
- gender/changing role and status of women
- law and order
- education
- availability of time
- availability of money
- transport.

#### **How contemporary factors are shaping the characteristics of, and participation in, sport in the 21st century:**

- class - amateur & professionalism
- gender/changing role and status of women
- law and order
- education
- availability of time
- availability of money



- transport

Globalisation of sport

- media coverage
- freedom of movement for performers
- greater exposure of people to sport.

## 2. Global sporting events

The modern Olympic Games

- background and aims (1896)
- political exploitation of the Olympic Games
- Berlin 1936, Third Reich Ideology
- Mexico City 1968 'Black Power' demonstration
- Munich 1972 Palestinian terrorism
- Moscow 1980 boycott lead by USA
- Los Angeles 1984 boycott by Soviet Union.

### Hosting global sporting events

- positive and negative impacts on the host country/city of hosting a global sporting event (such as the Olympic Games or FIFA World Cup)
- sporting
- social
- economic
- political.

### Modern technology in sport – its impact on elite level sport, participation, fair outcomes and entertainment

#### Elite performance:

- the extent to which modern technology has affected elite level sport including increased / improved:
- access
- facilities
- equipment
- monitoring of exercise
- safety.

#### General participation:

- the extent to which modern technology has increased participation including increased / improved:
- access
- facilities
- equipment
- monitoring of exercise
- safety.
- the extent to which modern technology has limited or reduced participation including:
- cost
- the range of alternatives to physical activity and sport

#### Fair outcomes:

the extent to which modern technology has increased fair outcomes including:

- better timing devices,
- increased accountability of officials
- more accurate decision making
- improved detection of foul play
- improved detection of doping.
- the extent to which modern technology has limited or decreased

fair outcomes including:



- access to modern technology can be limited
- performance enhancing drug testing technology cannot keep up with new drug development
- pressure on officials due to the exposure and scrutiny of their decisions.

**Entertainment:**

- the extent to which modern technology has increased entertainment including:
  - action replays,
  - multiple camera angles
  - slow motion technology
  - improved analysis
  - punditry.
- the extent to which modern technology has reduced or limited entertainment including:
  - interruption and delay
  - reduced live attendances.