BTEC

HIGHER NATIONALS

Sport and Exercise Science

Higher National Certificate Lvl 4

Pearson

Unit 6: Training, Fitness, Testing

Unit code	**A/616/1685**
Unit level	**4**
Credit value	**15**

Introduction

Fitness is essential to achieving success in sport and is vital for reaching the elite level. Elite athletes are capable of achieving amazing tasks like sprinting the final 100 metres in a 10,000-metre race, or sprinting the full length of a football pitch in the 90th minute of a game – something which can only be achieved by reaching optimal levels of fitness.

Training, fitness and testing can be applied within all areas of sport and exercise science because it examines the different fitness requirements of different sports, the different training methods that can develop these areas and the adaptations that occur within a team or individual as a result of these adopted methods. Understanding the principles of training is particularly important for many practitioners, including sports therapists working with sports performers in the later stages of rehabilitation, and sport and exercise scientists working with performers trying to peak for competition.

In addition to athletes performing on centre stage, training and fitness is also important for individuals who want to improve their performance in community sports activities and competitions. It is, therefore, fundamental to living a healthier lifestyle and developing the future health of the nation. With this in mind, it is important for professionals working in the sport and exercise industry to have an understanding of how to design fitness training programmes that meet the needs of a variety of individuals.

Fitness testing plays a vital role in the development of appropriate training programmes and, therefore, before these can be developed, sport and exercise scientists must assess the baseline fitness levels of their athletes. Developing an understanding of how to conduct field and laboratory based tests is crucial to students seeking a career within the sport and fitness industry. Being able to interpret the results and use them to identify strengths and areas for improvement and predict future performances is also vitally important.

Learning Outcomes

By the end of this unit students will be able to:

1. Explain the principles of training for sport and exercise
2. Assess the fitness levels of different sport and exercise participants
3. Plan safe and effective fitness training programmes for sport and exercise participants
4. Carry out safe and effective fitness training programmes for sport and exercise participants.

Essential content

LO1 **Explain the principles of training for sport and exercise**

Fitness requirements for sport and exercise:

Health-related components of fitness – cardiovascular endurance, strength, flexibility, muscular endurance, body composition

Skill-related components of fitness – speed, reaction time, agility, balance, co-ordination, power

Principles of training:

Principles – specificity, progression, overload, reversibility, individual needs/differences, tedium, variance

FITT principles – frequency, intensity, time, type

Theories of training:

General adaptation syndrome (GAS) theory, supercompensation cycle, periodisation (phases and cycles), tapering

LO2 **Assess the fitness levels of different sport and exercise participants**

Laboratory-based tests:

Laboratory-based testing, e.g. Wingate test, VO_2 max test, onset of blood lactate accumulation test, ventilator breakpoint testing

Appropriateness of tests – validity (internal and external), reliability (absolute, relative), generalisability

Field-based fitness tests:

Field-based testing, e.g. multi-stage fitness test, 12-minute Cooper run test, one-mile Rockport walking test, Harvard step test (cardiovascular endurance), 10 rep-max, sit up and press up test (muscular endurance), one rep max, grip strength test (strength), Illinois agility test, side-step test, shuttle run test (agility), stork stand test, balance beam test (balance), vertical jump test, Margaria-Kalamen staircase test (power), wall toss tests, block transfer test (co-ordination), ruler drop test, Batak reaction test (reaction time), skin fold caliper test, bio-electrical impedance (body composition)

Appropriateness of tests – validity (internal and external), reliability (absolute, relative), generalisability

Administration:

Health and safety – following safe testing protocols, pre-exercise client screening (Physical Activity Readiness Questionnaire (PAR-Q), height, weight, blood pressure, lung function) Informed consent

Practicality – selecting tests relevant to the individual, test sequencing and duration

Feedback:

Methods of feedback – verbal and non-verbal

Timing of feedback – at fitness testing session versus after fitness testing session

Interpretation of results – comparison of results to appropriate normative data

Data, setting training targets based on test results and requirements of the sport or exercise activity

LO3 **Plan safe and effective fitness training programmes for sport and exercise participants**

Training methods:

Endurance training methods, e.g. interval training, resistance training, fartlek training, continuous training

Strength training methods, e.g. free weights training, resistance machines, pyramid training, tri-sets and giant sets

Power training, e.g. plyometric training

Flexibility training, e.g. static stretching, dynamic stretching, proprioceptive neuromuscular facilitation

Core stability training

Strengths and limitations of each type of training

Design an appropriate training programme:

Design – use of fitness test results

Application of the principles of training (specificity, progressive overload, individual needs/differences)

FITT principles (frequency, intensity, time and type)

Use of appropriate training methods

Session planning

Evidence-based practice

Training goals (short-, intermediate and long-term)

Health and safety – PARQ, risk assessment of training area, strategies to avoid overtraining

LO4 **Carry out safe and effective training programmes for sport and exercise participants**

Carry out a training programme:

Following guidelines, e.g. process of completing different training methods, training at recommended levels

Review of a training programme:

Use of technology to record and review training programme – mobile phone fitness trackers e.g. My Fitness Pal and Strava, action cameras, e.g. GoPro cameras

Strengths and areas for improvement

Repeated fitness test results

Review of training goals – short-, intermediate and long-term goals

Recommendations for future development

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Explain the principles of training for sport and exercise		
P1 Examine the components of fitness in relation to sport and exercise **P2** Illustrate the principles of training in relation to sport and exercise	**M1** Assess the fitness requirements of selected sport and exercise activities	**D1** Analyse how the principles of training can be used to meet the fitness requirements of selected sport and exercise activities
LO2 Assess the fitness levels of different sport and exercise participants		
P3 Explain appropriate fitness tests for a selected sport and exercise participant **P4** Administer suitable fitness tests for sport and exercise participants	**M2** Analyse fitness test results in relation to appropriate normative data	**D2** Justify the choice of fitness tests for a selected sport and exercise participant
LO3 Plan safe and effective fitness training programmes for sport and exercise participants		
P5 Explain fitness training methods suitable for a selected individual and their specific activity **P6** Plan a fitness training programme suitable for a selected individual and their specific activity	**M3** Justify the design of a fitness training programme for a selected individual and their specific activity	**D3** Evaluate how the design of a fitness training programme will meet the needs of a selected individual and their specific activity
LO4 Carry out safe and effective training programmes for sport and exercise participants		
P7 Conduct a fitness training programme for a selected individual **P8** Review the effectiveness of a fitness training programme for a selected individual	**M4** Analyse the effectiveness of a fitness training programme for a selected individual, identifying strengths and areas for improvement and making recommendations for development	**D4** Justify recommendations for development in relation to the future goals of the selected individual

Recommended resources

Textbooks

ACSM (USA) (2017) *Guidelines for Exercise Testing and Prescription*. 10th edition. Wolters Kluwer.

COULSON, M. & ARCHER, D. (London) (2009) *Practical Fitness Testing: Analysis in Exercise and Sport*. A&C Black.

COULSON, M. (London) (2013) *The Fitness Instructor's Handbook.* A&C Black.

HEYWARD, V. & GIBSON, A. (USA) (2014) *Advanced Fitness Assessment and Exercise Prescription*. 7th edition. Human Kinetics.

Journals

British Journal of Sports Medicine

Exercise and Sport Science Reviews

Journal of Sports Science

Journal of Sports Science and Physical Fitness

Journal of Strength and Conditioning Research

Research Quarterly for Exercise and Sport

Websites

www.acsm.org	American College of Sports Medicine
www.bases.or.uk	British Association of Sport and Exercise Science

Links

This unit links to the following related units:

Unit 3: Anatomy & Physiology

Unit 9: Biomechanics

Unit 12: Community Coaching

Unit 16: Performance Analysis

Unit 18: Exercise Prescription

Unit 20: Health Community Engagement

Unit 21: Sport & Exercise for Specific Groups

Unit 26: Exercise Physiology

Unit 33: Strength & Conditioning for Coaching.