BIOS 3003 ADVANCED SPORTS PHYSIOLOGY

Credit Points 10

Legacy Code 400888

Coordinator Shona Papalia (https://directory.westernsydney.edu.au/search/name/Shona Papalia/)

Description In 2017, this subject is replaced by 401146 - Applied Physiology. This subject presents the knowledge and laboratory skills essential to understanding the physiological demands on the sports participant, as well as to develop, implement and evaluate sports-specific training programs. Students will develop the knowledge and skills necessary to perform and interpret results for a number of standard laboratory and field-based physiological tests used in talent identification and the assessment of high performance athletes. Prescription focuses on the development and implementation of sport specific fitness programs. Also covered are the physiology of ergogenic aids, overtraining, muscle fatigue and soreness; physiological factors limiting performance; and physiological responses to exercise in challenging environments.

School Health Sciences

Discipline Human Biology

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Undergraduate Level 3 subject

Pre-requisite(s) HLTH 2006 AND
HLTH 2004 AND
BIOS 2037

Equivalent Subjects BIOS 3022 - Sports Physiology

Restrictions

Students must be enrolled in program 4658 - Bachelor of Health Science (Sport and Exercise Science).

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Discuss how a variety of physiological, metabolic, hormonal and neural factors may limit athletic performance;
2. Explain the scientific basis for talent identification, the selection of athlete assessment procedures and the adaptations required for different age groups;
3. Organise, conduct and interpret the results of an array of physiological laboratory and field based techniques used in the assessment of high performance athletes and in talent identification including VO2max; anaerobic threshold, OBLA, anaerobic exercise capacity; plus muscular strength, power and endurance; flexibility (ROM); speed; power; general functional movement and functional skill; and other sport specific tests.
4. Identify the relative importance of the fitness components to performance in a sport and positions within a sport, and describe the effects of different types of sports training (and detraining) on physiological, hormonal, immunological, metabolic and neural responses and adaptations to exercise and on sport specific test results.
5. Demonstrate an ability to: assess athletes fitness; promote, design programmes, implement, supervise, demonstration, monitor and evaluate effective programs for individual athletes and sporting teams (who are children; adolescents, adults and older individuals) for training improvements in: flexibility, aerobic and anaerobic power and capacity, lactate tolerance, anaerobic threshold, metabolic efficiency, strength, speed and power.
6. Describe and explain the effects of challenging environments on sports training and performance including: heat, cold, altitude, pollution.
7. Explain the potential risks and benefits of various physiological ergogenic aids on exercise performance and general health including but not limited to the effects of anabolic steroids, autologous blood transfusion ('blood doping', erythropoietin and growth hormone.
8. Describe the signs, causes and contributing factors related to over training syndrome.
9. Explain how muscular fatigue, weakness, muscular soreness acute muscle soreness and delayed onset muscle soreness may affect biomechanics of motion and thus quality of training and sports performance.
10. Critically evaluate current research literature on the mechanisms on muscular fatigue, acute muscle soreness and

Subject Content

Testing of high performance athletes.
1. Factors that limit athletic performance
a. Physiological
b. Metabolic
c. Hormonal
d. neural
2. Physiological testing of athletes - Scientific basis for athlete testing and Criteria for selecting tests
a. Choosing attributes to be tested and the tests to be used
- identifying important fitness Attributes for A sport
- role of Notational and Game analysis
- ability to discriminate, accuracy, Validity and reliability
- children Vs adolescents Vs adults Vs older individuals
- Catering for current Sports performance level
b. The AIS laboratory standards assistance scheme and Laboratory accreditation
c. General pre-test management and administration
- consent forms
- medical/health assessment/Screening
- explanation of procedures
- Privacy and Personal Information Protection Act 1998 (PPIPA) and the Health Records and Information Privacy Act 2002 (HRIPA) and how they apply to information collected from a client
- legal requirements for individuals Working with children in sport and how An individual shows that they comply with those requirements
- strategies and systems that need to be implemented to ensure The minimisation of health and injury risks associated with training and testing in sport
- record keeping
d. Tests used by sports scientists and their purposes: Characteristics of good measurement, statistics and related terminologies with examples from literature. Fundamental techniques in measurement e.g. controls, accuracy, test selection, recording. Validity, reliability and objectivity using known tests in a laboratory setting. Norms (percentiles and stanines)
e. Tests used by sports coaches and trainers
f. The tests including VO2max; anaerobic threshold, OBLA, anaerobic exercise capacity; plus muscular strength, power and endurance; flexibility (ROM); speed; power; general functional movement and functional skill; and other sport specific tests

g. Assessment procedures for specific sports including calculations and interpretation of resulting data (Running and a team sport)
h. Associated Practical
- equipment calibration
- organise, conduct and interpret The results of An array of physiological laboratory and field based techniques used in The assessment of High performance athletes and in talent identification
3. Talent identification in children, adolescents and young adults
a. Discussion of tests for sports: where identification works well; Where it doesn't work well. The Australian eNTID and other programs
4. Sport specific training
a. Effects of different types of sports training (and detraining) on physiological, hormonal, immunological, metabolic and neural responses and adaptations to exercise and on sport specific test results
b. Programme design
- promotion and evaluation, individual athletes and sporting teams (who are children; adolescents, adults and older individuals) for training improvements in: flexibility, aerobic and anaerobic power and capacity, lactate tolerance, anaerobic threshold, m
- year-round training; periodisation of training (in commonly seen proformas), peaking and tapering, off season training
- developing fitness for optimum performance in specific Sports
- associated practical: program design, implement, supervise, demonstration, Monitor and Evaluate
5. Overtraining
a. Causes and contributing factors
b. Signs and symptoms
c. Effects on
- athlete performance in training and Competition
- on fitness and fitness test results
d. Prevention
e. Treatment
f. Retraining after overtraining syndrome
6. Ergogenic aids
a. Definitions of ergogenic aid and doping
b. The IOC rules what and why
- drugs (therapeutic Vs illegal)
c. Specific drug categories
- anabolic steroids
- blood doping
- amphetamines
- erythropoeitin
- growth hormone
7. Environmental sports physiology implications for sports performance
a. Thermoregulation
b. Altitude
c. Circadian rhythms
d. Pollution
8. Nutrition and Hydration for high performance and elite a

Special Requirements

Legislative pre-requisites

Prior to enrolling in this subject, students must have:

1) submitted a Student Undertaking Form and have applied for a National Police Certificate;
2) submitted Working with Children Check Student Declaration;
3) possess a current WorkCover Authority approved First Aid Certificate.