Module Definition Form (MDF)

Module code: MOD005688	**Version:** 5 **Date Amended:** 14/Sep/2020

1. Module Title
Physiological Basis of Training

2a. Module Leader
Dan Gordon

2b. School
School of Psychology, Sport and Sensory Sciences

2c. Faculty
Faculty of Science and Engineering

3a. Level
6

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	BSc (Hons) Sport and Exercise Science, BSc (Hons) Strength and Conditioning, BSc Sports and Rehabilitation Therapy		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module will delve into the fascinating but sometimes controversial domain of training science and explore the nature training programme design, athlete development and limitations to the success of the athlete. To this end the module will commence with an exploration of what constitutes performance, examining the physiological and metabolic demands of sports. The major component of this module will though address the principles of training application and design. Consideration will be given to the laws of training in the context of the developing athlete and how these are linked to the of one-factor and two-factor theories of super-compensation. Time will be devoted to the nature of fatigue both as a prerequisite to the training adaptation but also as a function of the training load examining the peripheral and central manifestations of this key training mechanism. Fatigue will also be explored in the context of recovery and methods of recovery. In the context of fatigue and training adaptation the role of cellular messengers such as PGC-1α and mTOR will be considered to show how an adaptation manifests. The notion of fatigue, training and recovery will lead into the evaluation of under-performance syndrome addressing both what this is as psychobiological construct but also how this can be both monitored and avoided. These elements will all be brought together to evaluate the programing of training using an array of approaches including linear and non-linear periodisation and block training models and how these programmes can either through the use of a taper lead to an athletic peak or through the application of undulating loads lead to a maintenance of performance. A major aspect of this module will focus on populations, with particular reference to children, females and the disabled, the underlying biology will considered as well as how training had to be adjusted to accommodate this 'special' populations.

This module will help to continue developing a series of transferable skills including practical (laboratory) techniques and skills relevant to general employment including report writing, data collection, handling and presentation and will be of particular interest to individuals wishing to apply their exercise physiology knowledge and work within a Sports Science Support environment both with athletes and clinical populations. The context for the journey within this module will be established using a series of live briefs showcasing how these concepts and transferable skills are utilised by graduates of ARU in the workplace.

6b. Outline Content

- Physiological rationale: Intensity, frequency, duration, volume, load
- Training models: Overload, accommodation, specificity, individualisation, super-compensation
- Fatigue mechanisms: peripheral, central, signal transduction, Satellite cells, genetics
- Underperformance syndrome: immunological, physiological;, biochemical mechanisms
- Programme design: Block training, linear-periodisation, non-linear periodization
- Training outcomes: Peaking, tapering, cessation, maintenance
- Special populations: Females, children, disabled

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources
Cambridge Centre for Sport and Exercise Sciences Technician support

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Critically demonstrate the physiological rationale to training program design and structure.
2	Knowledge and Understanding	Critically appraise the methods and mechanisms leading to training adaptations.
3	Intellectual, practical, affective and transferrable skills	Apply critically evaluated physiological knowledge to the development of athletes of all abilities.
4	Intellectual, practical, affective and transferrable skills	Apply critically evaluated physiological knowledge to the assessment of the physical and conceptual demands of sport.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2025/6	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	24	1-4	Lectures 2 hours per week
Other teacher managed learning	12	3-4	Seminars: 1 hour per week
Student managed learning	114	1-3	Completion of weekly readings, tasks and preparation for assessments
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
010	Practical	1-4	50 (%)	Fine Grade	30 (%)
Presentation in a suitable format to evaluate the physiological and metabolic demands of a selected sport, (750 words equivalent). In-class assessments related to peer-reviewed articles. (750 words equivalent).					

Assessment components for Element 010				
Component No.	**Assessment Title**	**Submission Method**	**Weighting (%)**	**Components needed for Mark Calculation?**
010/1	Info-graphic of physiological demands	Canvas	50 (%)	All
010/2	In-class tests	Scheduled Activity: Timetabled assessment task	50 (%)	

Assessment No.	**Assessment Method**	**Learning Outcomes**	**Weighting (%)**	**Fine Grade or Pass/Fail**	**Qualifying Mark (%)**
011	Coursework	3-4	50 (%)	Fine Grade	30 (%)
Athlete report and feedback, based on collected physiological data pertinent to the selected athletic discipline 1500 words					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]