A close-up of a logo

Description automatically generated with low confidence

*Undergraduate Medical Sciences*

*School of Medicine, Medical Sciences & Nutrition*



*SR4007- Research Topics in Sports*

*Science and Sports Studies*

*Course Handbook 2023-2024*

Contents

Course Summary (3)

[Course Aims & Learning Outcomes](#_Toc78464227)

[Course Teaching Staff](#_Toc78464228)

[Assessments & Examinations](#_Toc78464229)

[Class Representatives](#_Toc78464230) (4)

[Problems with Coursework](#_Toc78464231) (5)

[Lecture Synopsis](#_Toc78464233) & [Course Reading List](#_Toc78464232)

[Practical/Lab/Tutorial Work](#_Toc78464234) (17)

[University Policies](#_Toc78464236) (18)

[Academic Language & Skills support](#_Toc78464237) (19)

[Medical Sciences Common Grading Scale](#_Toc78464244) (20)

[Course Timetable SR4007: 2023-2024](#_Toc78464245) (21)

Campus and Floor Maps

Course Summary

This course provides a detailed coverage of research topics in Sport Science and Exercise and Health Science. It will emphasise different factors, which contribute to overall health, sport, exercise performance, and consider any relevant adaptations that occur in response to different types of training. It will include a detailed consideration of seven research topics, and focus on the factors particular to each.

Course Co-ordinator: Dr Derek Ball (ext. 7456) derek.ball@abdn.ac.uk

Course Aims & Learning Outcomes

To enable students to be able to:

* Demonstrate relevant literature search skills and techniques.
* Demonstrate relevant presentation skills and techniques.
* Demonstrate relevant writing and abstract preparation skills.
* Demonstrate critical thinking and analysis of scientific papers
* Develop a detailed understanding of research topics and literature relevant to Sports Science and Exercise and Health in areas of physiology, nutrition, exercise, health, fitness and performance.

Other topics will be included to reflect the up-to-date research interests within the School of Medical Sciences.

Course Teaching Staff

Course Coordinator:

Dr Derek Ball (DB), Medical Sciences

Other Staff:

Ms Mel Bickerton (MB), Med Lib

Dr Jenny Gregory, (JG), Medical Sciences

Dr Michael E Scholz (MES), Medical Sciences

Professor Derek Scott (DAS), Medical Sciences

Dr Derryck Shewan (DS), Medical Sciences

Assessments & Examinations

Students are expected to attend all lectures, tutorials, and presentation sessions and to complete all class exercises by stated deadlines. It is imperative that any reasonable excuses for the late handing in of work are made to the course organiser (Dr Derek Ball) before the deadline date. Otherwise, the work will not be marked and the class certificate, which is required to sit the examination, may be withheld. The minimum performance acceptable for the granting of a class certificate is attendance at all the presentation sessions, and presentation of all set course work, both written and oral.

Continuous assessment: 30% of the course assessment is based on material to be submitted and/or presented during the course. Each student will complete the following continuous assessments: one oral presentation, one questioning the presenter, two abstracts and a timed essay (week 14). Continuous assessments will thus be divided as: a grade for the oral presentation 30% and questioning (10%) and separate grades for the three written assignments (60%: 20% each). Oral presentations will be recorded using Panopto, however, these recordings will only be made available to the external examiner.

Written Examination: 70% of the course assessment is based on one three-hour written paper. Students will answer three essay questions from a choice of six.

Common grading scale (CGS) grade: The overall performance of the student is expressed as a grade awarded on the common spine marking scale (see attached sheet).

The degree examination for this course will be held in the May/June examination diet.

# 

Class Representatives

We value students’ opinions regarding the enhancement of quality of teaching and its delivery; therefore, in conjunction with the Students’ Association we support the Class Representative system.

In the School of Medicine, Medical Sciences & Nutrition we operate a system of course representatives, who are elected from within each course. Any student registered within a course that wishes to represent a given group of students can stand for election as a class representative. You will be informed when the elections for class representative will take place.

What will it involve?

It will involve speaking to your fellow students about the course you represent. This can include any comments that they may have. You will attend a Staff-Student Liaison Committee and you should represent the views and concerns of the students within this meeting. As a representative, you will also be able to contribute to the agenda. You will then feedback to the students after this meeting with any actions that are being taken.

Training

Training for class representatives will be run by the Students Association. Training will take place within each half-session. For more information about the Class representative system visit [www.ausa.org.uk](http://www.ausa.org.uk) or email the VP Education & Employability [vped@abdn.ac.uk](mailto:vped@abdn.ac.uk) . Class representatives are also eligible to undertake the STAR (Students Taking Active Roles) Award with further information about this co-curricular award being available at: [www.abdn.ac.uk/careers](http://www.abdn.ac.uk/careers).

Problems with Coursework

If students have difficulties with any part of the course that they cannot cope with, alone they should notify the course coordinator immediately. If the problem relates to the subject matter general, advice would be to contact the member of staff who is teaching that part of the course. Students with registered disabilities should contact the medical sciences office, ([medsci@abdn.ac.uk](mailto:medsci@abdn.ac.uk)) (based in the Polwarth Building, Foresterhill) to ensure that the appropriate facilities have been made available. Otherwise, you are strongly encouraged to contact any of the following as you see appropriate:

* Course student representatives
* Course co-ordinator
* Convenor of the Medical Sciences Staff/Student Liaison Committee (Dr Donna McCallum)
* Personal Tutor
* Medical Sciences Disabilities Co-ordinator (Dr Derryck Shewan)

All staff are based at Foresterhill and we strongly encourage the use of email or telephone the Medical Sciences Office. You may have a wasted journey travelling to Foresterhill only to find staff unavailable.

If a course has been completed and students are no longer on campus (i.e. work from second half session during the summer vacation), coursework will be kept until the end of Fresher’s Week, during the new academic year. After that point, unclaimed student work will be securely destroyed.

Lecture Synopsis & Course Reading Lists

All teaching will take place at the University’s Medical School site. In each of the following modules, each class member will be assigned to cover one of the listed topics. An oral presentation on this topic should be prepared for the seminar session on the last day of the module. The presentation should be planned to last not more than 10 min and should include suitable visual aids. All members of the class and the Module Tutor will be expected to contribute to the discussion on each of the topics. The aim of the presentation is to begin the discussion by highlighting the key areas. A brief written summary (abstract) of the topic (not to exceed one A4 page) should be prepared and submitted online through TurnitinUK on the SR4007 MyAberdeen course page by 2.30pm, on either the Monday or Wednesday, of each module as indicated in the timetable. The abstract should highlight the key issues to be covered. Electronic copies of all original abstracts will be posted on MyAberdeen at the end of the course

Module 1: Applied Physiology – Dr M Scholz/Dr J Gregory

Module 2: **Limitations to physical capacity during exercise and the causes of fatigue** – Dr D Ball

Module 3: Sport & Exercise Pharmacology - Prof D Scott

Module 4: Comparative physiology: athletes of the animal world – Dr D Ball

Module 5: Satellite Cells – **Dr M Scholz**

Module 6: Nutrition, health and Performance - Dr D Ball

**Module 1**

Applied Physiology

Tutor: Dr M Scholz/J Gregory

Learning Outcomes

Establish the link between fundamental physiology and experiments and measurements to assess characteristics and performance of organ systems important for exercise. The neuromuscular system and endurance will be the main focus.

Topics to be discussed in detail

1. Mechanical components of the skeletal muscle - Passive versus active force production
2. Dependencies of muscle force and power
3. Dependencies of muscle contraction velocity
4. Cross innervation and its influence on fibre types
5. Endurance fitness – direct versus indirect assessment
6. Measurements to assess neuro-muscular performance – direct assessments
7. Assessment of muscle performance – 1 rep max, MVF production
8. Assessment of neuro-muscular performance using stimulation
9. Comparison of contraction types
10. Determinants of endurance
11. Skeletal muscle fibre type determination

### Reading list

* Skeletal Muscle (2nd Edition), Form and Function, Brian MacIntosh, Phillip Gardiner, Alan McComas, Human Kinetics © 2006
* Textbook of Work Physiology-4th Edition, Physiological Bases of Exercise, Per Olof Åstrand, Kaare Rodahl, Hans Dahl, Sigmund B. Strømme Human Kinetics © 2003
* Cross-innervated mammalian skeletal muscle: histochemical, physiological and biochemical observations. Victor Dubowitz J Physiol. 1967 Dec; 193(3): 481–496.3.
* C57BL/6 life span study: age-related declines in muscle power production and contractile velocity. Graber TG1, Kim JH, Grange RW, McLoon LK, Thompson LV. Age (Dordr). 2015 Jun;37(3):9773. doi: 10.1007/s11357-015-9773-1. Epub 2015 Apr 17.
* Influence of different shortening velocities preceding stretch on human triceps surae moment generation in vivo. Gianpiero De Monte, Adamantios Arampatzis, Journal of Biomechanics Volume 41, Issue 10, 19 July 2008, Pages 2272–2278
* Defining muscle elastance as a parameter. Joseph L. Palladino, Senior Member, IEEE and Abraham Noordergraaf, Life Fellow, IEEE Proceedings of the 29th Annual International Conference of the IEEE EMBS Cité Internationale, Lyon, France August 23-26, 2007
* Validity of 20-MST for predicting VO2max of adult Singaporean athletes” J Sproule, C Kunalan, M McNeill, H Wright, *Br J Sports Med 1993;27:202-204*
* Measurement of physical activity” Rod K. Dishman, Richard A. Washburn & Dale A. Schoeller, pages 295-309, Quest Volume 53, Issue 3, 2001
* The measurement of maximal (anaerobic) power output on a cycle ergometer: a critical review. Driss T, Vandewalle H, Biomed Res Int. 2013; 2013:589361
* Developing maximal neuromuscular power: Part 1--biological basis of maximal power production. Cormie P, McGuigan MR, Newton RU, Sports Med. 2011 Jan 1;41(1):1738
* Developing maximal neuromuscular power: part 2 - training considerations for improving maximal power production. Cormie P, McGuigan MR, Newton RU, Sports Med. 2011 Feb 1;41(2):125-46.
* Advances in surface EMG: recent progress in detection and processing techniques. Merletti R1, Aventaggiato M, Botter A, Holobar A, Marateb H, Vieira TM, Crit Rev Biomed Eng. 2010;38(4):305-45.
* Changes in the force-velocity relationship of fatigued muscle: implications for power production and possible causes. Jones DA, J Physiol. 2010 Aug 15;588(Pt 16):2977-86.
* Calcineurin regulates slow myosin, but not fast myosin or metabolic enzymes, during fast-to-slow transformation in rabbit skeletal muscle cell culture Joachim D. Meißner\*, Gerolf Gros, Renate J. Scheibe, Michael Scholz and Hans-Peter Kubis, The Journal of Physiology, Volume 533, Issue 1, pages 215–226, May 2001

Module 2

**Limitations to physical capacity during exercise and the causes of fatigue**

Tutor: Dr Derek Ball

Learning Outcomes

The overarching theme for this topic is to explore the concept of fatigue in relation to muscle and nerve function. It will examine whether the fatigue experienced by an athlete is mainly a central signal generated in the CNS, or a peripheral failure of motor nerves and/or muscle fibres in their attempt to continue function appropriately to entirely normal CNS signals. The content will range from the phenotype of muscle fibre types related to their contractile and metabolic profile, central control of motor unit recruitment, normal synaptic function and reflexes, the metabolic processes activated to meet ATP turnover, the accumulation of by-products of metabolism and substrate depletion.

At the end of the presentations on all the topics, you will have an understanding of:

1. Muscle fibre type and myosin expression determine the contractile characteristics.
2. The importance of the CNS in the control of movement.
3. Neuromuscular transmission and muscle contraction in different fibre types.
4. How the elements of muscle recruitment, muscle energetics contribute to and are affected by fatigue.
5. Explore other aspects of fatigue that are not directly related to muscle metabolism for example, the influence of the environment on human performance.

Topics to be discussed in detail:

1. Muscle fatigue during brief intense exercise
2. The effects of the environment on the development of fatigue
3. Clinical and pathology impacts on the fatigue process.
4. The development of fatigue during exercise requiring 100-120 % VO2max
5. The consequences of repeated prolonged exercise on a daily basis and the manifestation of fatigue.

### Reading list

Research papers and related material

* Ball D Metabolic and endocrine response to exercise: sympathoadrenal integration with skeletal muscle. (2015) J Endocrinol. 224:79-95. Review
* Ball D. (2020) Contrasting effects of heat stress on neuromuscular performance. Exp Physiology. <https://doi.org/10.1113/EP088191>
* Bernard S, LeBlanc P, Whittom F, et al. Peripheral muscle weakness in patients with chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 1998;158:629–634. doi:10.1164/ajrccm.158.2.9711023
* F Cibella G Cuttitta B Kayser M Narici S Romano F Saibene (1996) Respiratory mechanics during exhaustive submaximal exercise at high altitude in healthy humans. J Physio <https://doi.org/10.1113/jphysiol.1996.sp021540>
* Dobkin BH. (2008) Fatigue versus activity-dependent fatigability in patients with central or peripheral motor impairments. Neurorehabil Neural Repair 22:105-110. Review.
* Knicker AJ, Renshaw I, Oldham AR, Cairns SP. Interactive processes link the multiple symptoms of fatigue in sport competition. Sports Med. 2011 41:307-28. Review
* Fitts RH Cellular mechanisms of fatigue. (1994) Physiol Reviews 74:49-94. Review.
* Saris WHM, van Erp-Baart, Brouns F, et al (1989) Study on Food intake and Energy Expenditure During Extreme Sustained Exercise: The Tour de France. Int J Sports Med. 10 S26-31. DOI: [10.1055/s-2007-1024951](https://www.researchgate.net/deref/http%253A%252F%252Fdx.doi.org%252F10.1055%252Fs-2007-1024951?_sg%255B0%255D=QmUZu9f5VGQImoMq_Pw1y_uog8U3Rb3UJWjQDUjj7BZt68-kJMj5SyJObwYt3SMmgug4lpNVJQA7gfeAblKAeiJ3lw.lH82xV0p-bmZr0tOjebNA0KtL0HcVdCRY8qPjbRB8YLSlmG_Uszb_-FJttbPjkDOc-D4722t53HHGxX0hS-hKg)
* Maltais F, Decramer M, Casaburi R, et al. An official american thoracic society/European respiratory society statement: update on limb muscle dysfunction in chronic obstructive pulmonary disease. *Am J Respir Crit Care Med*. 2014;189:e15–e62. doi:10.1164/rccm.201402-0373ST
* Spangenburg EE, Booth FW. (2003) Molecular regulation of individual skeletal muscle fibre types. Acta Physiol Scand. 178:413-424. Review.
* Vissing J and Haller RG (2003) A diagnostic cycle test for McArdle’s disease. Ann Neuro <https://doi.org/10.1002/ana.10725>
* Weir JP, Beck TW, Cramer JT, Housh TJ. (2006) Is fatigue all in your head? A critical review of the central governor model. Br J Sports Med. 40:573-586. Review.
* Zwarts MJ, Bleijenberg G, van Engelen BG. (2008) Clinical neurophysiology of fatigue. Clin Neurophysiol. 119:2-10. Review

**Module 3**

Sport & Exercise Pharmacology

Tutor: Prof Derek Scott

Learning Outcomes

In recent years, drug and supplement use have increased substantially in athletes and patients, so an understanding of how these substances affect their health and exercise capacity is essential. We need to understand how certain drugs might impact on exercise capability and performance and thus, recommend the best forms of exercise for a person taking medication. Since some medications can be viewed as “performance-enhancing”, it also allows us to know when medications can be reasonably taken by athletes to treat a condition before it could be considered that they are receiving an unfair advantage.

This module aims to provide a brief introduction to how some of the more commonly prescribed drugs can affect exercise performance in patients and athletes. Students will receive some basic instruction in pharmacology, and we will mainly focus on drugs acting upon the cardiovascular and respiratory systems. We will NOT be considering steroids in this module.

Topics to be included are:

1. Outline of the most commonly-used and abused drugs in cardiovascular and respiratory disease.
2. Who decides which drugs can be used to treat patients and athletes?
3. How do drugs affect physical activity in patients?
4. How do drugs affect physical activity in athletes?
5. How can exercise change the effect of drugs?
6. How can exercise reduce the need for drug therapy for many chronic medical conditions?

Topics to be discussed in detail:

1. What are the challenges of using heart rate as a measure of exercise intensity/capacity in patients taking cardiovascular drugs?
2. Do certain types of sports have higher rates of abuse of certain prescription drugs than others?
3. Define a general exercise and drug regime for a white, male, 24 year old student who has had a blood pressure of 150/90mmHg for a period of several months. Provide experimental or peer-reviewed evidence for your regime.
4. Define a general exercise and drug regime for a black, female, 60 year old doctor who has had a blood pressure of 150/90mmHg for a period of several months and arthritis that causes her severe pain. Provide experimental or peer-reviewed evidence for your regime.
5. What advice regarding exercise, training and medication would you give to a professional triathlete who says they are asthmatic?
6. Using the some of the prescription drugs discussed in the lecture, explain who decides on what is legal to use by athletes during sports events and what the legislation is regarding these medications. You should give some explanation of how athletes prove that they really require drug treatment for a medical condition and are not cheating.
7. Physical activity and cardiovascular drugs in patients
8. Physical activity and respiratory drugs in patients
9. Discuss the effects of diuretics on exercise performance.

### Reading list

General Reading:

* Kayne, S.B. (2006) Sport and exercise medicine for pharmacists. London: Pharmaceutical Press.
* Reents, S. (2000) Sport and exercise pharmacology. Champaign, IL: Human

Kinetics.

Reviews:

* Davis, E., Loiacono, R., Summers, R.J. (2008) The rush to adrenaline: drugs in sport acting on the beta-adrenergic system. Br J Pharmacol. 154(3):584-97.
* Skinner, J.S., Cooper, A., Feder, G.S.; Guideline Development Group. (2007) Secondary prevention for patients following a myocardial infarction: summary of NICE guidance. Heart. 93(7):862-4.
* Ellender, L., Linder, M.M. (2005) Sports pharmacology and ergogenic aids. Prim Care. 32(1):277-92.

Niedfeldt, M.W. (2002) Managing hypertension in athletes and physically active patients. Am Fam Physician. 66(3):445-52. Summary for patients in: Am Fam Physician. 2002 Aug 1;66(3):457-8.

* Pescatello, L.S., Franklin, B.A., Fagard, R., Farquhar, W.B., Kelley, G.A., Ray, C.A.; American College of Sports Medicine. (2004) American College of Sports Medicine position stand. Exercise and hypertension. Med Sci Sports Exerc. 36(3):533-53.
* Anderson, S.D., Sue-Chu, M., Perry, C.P., Gratziou, C., Kippelen, P., McKenzie, D.C., Beck, K.C., Fitch, K.D. (2006) Bronchial challenges in athletes applying to inhale a beta2-agonist at the 2004 Summer Olympics. J Allergy Clin Immunol. 117(4):76773. Epub 2006 Mar 3.
* Alaranta, A., Alaranta, H., Helenius, I. (2008) Use of prescription drugs in athletes. Sports Med. 38(6):449-63.

Students who wish to find out more about the official guidelines on how we treat patients who suffer from asthma and cardiovascular problems can access them at www.sign.ac.uk. SIGN (and other organisations such as NICE in England and Wales) review all of the available information to determine what the most effective treatments are for various conditions. The references at the end of the guidelines may be very useful to you. Please note that some of these guideline documents are very large, so avoid printing the whole document. Some of them have summary statements and diagrams that can simplify things for you.

**Module 4**

**Comparative physiology, athletes of the animal world**

**Tutor: Dr Derek Ball**

Learning Outcomes

Human elite athletes are easily distinguishable from the normal population in relation to aerobic capacity, power output, power to weight ratio, height, mass, muscle fibre composition. However, in terms of relative aerobic capacity or power weight ratio or the ability to breath-hold for example, how do elite athletes compare with examples from the animal kingdom? The module will consider the physical performance characteristics of the “athletes” of the animal kingdom and discuss the physiological factors that provide them with the capacity that far exceeds human performance.

Topics to be included:

1. Fastest running velocity
2. Maximum aerobic capacity
3. Heart mass to body mass ratio
4. Breath hold capacity in aquatic reptiles
5. Diving ability in seals and dolphins

Reading list:

Module 5

Satellite cells: muscular stem cells in sport, exercise and regeneration

**Tutor: Dr M**ichael **Scholz**

Learning Outcomes

The adult muscle is terminally differentiated, multinucleated and mitotically inactive. Adult skeletal muscle cells are in the G0-Phase of the cell cycle and incapable of re-entering the cell cycle and starting to proliferate again.

Satellite cells are stem cells of the adult muscle, resting inactively between the muscle fibre and the basal lamina. They are activated by exercise, overload or injury. Once activated, they start to proliferate and, after some cycles of division, they differentiate and fuse to the existing myotubes and to each other.

A small proportion becomes quiescent again and replenishes the stem cell pool. Reduced activity and numbers of satellite cells are related to atrophy and ageing. Thus, they are important for maintenance, growth (hypertrophy) and regeneration of the muscle during sport and exercise, diseases or injury.

Learning Outcomes

To understand the role of satellite cells in sport, exercise and regeneration. More specifically, to investigate:

1. Understand the cell cycle and its regulation in stem cells.
2. Understand what stem cells are, and how are they characterised.
3. Understand what muscle satellite cells are.
4. Understand the concept of the myonuclear domain.
5. Assess the importance of satellite cells in muscle regeneration and maintenance.
6. Assess the importance of satellite cells in exercise-induced adaptation and muscle hypertrophy.
7. Understand regulation of satellite cells under different conditions

Topics to be discussed in detail:

1. What makes a satellite cell a satellite cell?
2. Satellite activation, control and self-renewal – why do we not run out of muscle stem cells?
3. Myonuclear domains in muscle adaptation
4. Satellite cells and hypertrophy.
5. Satellite cells and doping – steroid effects and testosterone
6. Satellite cells, atrophy and aging
7. Satellite cells, hypertrophy and hyperplasia – an ongoing controversy
8. Stem cells: regulation of cell cycle – “awakening”, proliferation, differentiation

### Reading list

Research papers and related material

* Allen, D. L., Roy, R. R. and Edgerton, V.R. (1999) “Myonuclear domains in adaptation and diseases”. Muscle Nerve 22: 1350–1360
* Bischoff, R. (1990). "Cell cycle commitment of rat muscle satellite cells." J Cell Biol 111: 201-207.
* Chen,Y., Zajac J. D. and MacLean, H. E. (2005) “Androgen regulation of satellite cell function.” Journal of Endocrinology 186: 21–31
* Collins, C. A., Olsen, I., Zammit, P. S., Heslop, L., Petrie, A., Partridge, T. A. and Morgan, J. E. (2005) “Stem Cell Function, Self-Renewal, and Behavioral

Heterogeneity of Cells from the Adult Muscle Satellite Cell Niche” Cell 122: 289-301.

* Cossu, G. and Tajbakhsh, S. (2007) “Oriented Cell Divisions and Muscle Satellite Cell Heterogeneity” Cell 129: 859-861
* Gallegly, J. C., Turesky, N. A., Strotman, A. S., Gurley, C. M., Peterson C. A. and Dupont-Versteegden E. E. (2004) “Satellite cell regulation of muscle mass is altered at old age”, J Appl Physiol 97: 1082–1090
* Hawke, T. J. and Garry, D. J. (2001) “Myogenic satellite cells: physiology to molecular biology.” J Appl Physiol 91: 534–551
* Kadi, F., Ericsson, A., Holmner, S., Butler-Browne, G. S. and Thornell, L. E. (1999). "Cellular adaptation of the trapezius muscle in strength-trained athlets." Histochem Cell Biol 111: 189-195.
* Kadi, F., Schjerling, P.,Andersen, L. L., Charifi, N., Madsen, J. L. Christensen L. R. And Anderson, J. L. (2004) “The effect of heavy resistance training and detraining on

satellite cells in human skeletal muscle” J Physiol 558(3): 1005-1012

Kadi, F. (2008) “Cellular and molecular mechanisms responsible for the action of testosterone on human skeletal muscle. A basis for illegal performance enhancement” British Journal of Pharmacology 154: 522–528

* Pardee, A. B. (1989). "G1 events and regulation of cell proliferation." Science 246: 603-608
* Potten, C. S. und Loeffler, M. (1990). "Stem cells: Attributes, cycles, spirals, pitfalls and uncertainties." Development 110(4): 1001-1020.
* Roy, R. R., Monke S.R., Allen D.L. and Edgerton V. R. (1999) “Modulation of myonuclear number in functionally overloaded and exercised rat plantaris fibers”. J. Appl. Physiol. 87(2): 634–642
* Seale, P., Luc A. Sabourin, L. A., Girgis-Gabardo, A., Mansouri, A., Gruss, P. and Rudnicki, M. A. (2000) “Pax7 Is Required for the Specification of Myogenic Satellite Cells” Cell 102: 777–786
* Seale, P. and Rudnicki, M. A. (2000) “A New Look at the Origin, Function, and “StemCell” Status of Muscle Satellite Cells” Developmental Biology 218: 115–124
* Smith, H. K., Maxwell, L., Rogers, C. D., McKee, N. H. and Plyley, M. J. (2001) “Exercise-enhanced satellite cell proliferation and new myonuclear accretion in rat skeletal muscle” J Appl Physiol 90: 1407–1414
* Zammit, P.S. and Beauchamp, J. R. (2001) “The skeletal muscle satellite cell: stem cell or son of stem cell?” Differentiation 68:193–204

Module 6

**Nutrition**

Tutor: Dr Derek Ball

Learning Outcomes

To understand the role of nutrition in high performance level and consider how specific nutrients might enhance performance. Specifically to:

1. Understand the effects of macronutrient and energy intake on elite performance
2. Understand the effects of micronutrient intake on elite performance
3. To assess whether different forms of nutritional supplementation can affect health or performance and the precautions to dietary supplementation.

Topics to be discussed in detail:

1. Dietary practices to maintain or enhance muscle mass
2. The adoption of extreme dietary habits and the impact on performance
3. Dietary recommendations for fluid balance, prior to during or post-exercise.
4. The efficacy of dietary supplements on enhancing exercise performance
5. Contamination of dietary supplements and the risk of an adverse drug test result.
6. Vitamin supplementation and the evidence for enhanced health and well-being.

Reading list

General Reading:

* Clinical Sports Nutrition by Louise Burke and Vicki Deakin 5th edition, 2015. ISBN 9781743073681

Research papers and related material

* Campbell B et al, International Society of Sports Nutrition position stand: protein and exercise. . J Int Soc Sports Nutr. 2007, 4-8
* Cannell JJ, Hollis BW, Sorenson MB, Taft TN, Anderson JJ. Athletic performance and vitamin D. Med Sci Sports Exerc. 2009 May; 41(5):1102-10.
* Ivy, JL et al Early post exercise muscle glycogen recovery is enhanced with a carbohydrate-protein supplement J Appl Physiol 2002 93: 1337-1344
* Maughan RJ, Greenhaff PL, Hespel P. Dietary supplements for athletes: emerging trends and recurring themes. J Sports Sci. 2011; 29 Suppl 1:S57-66.
* Maughan RJ, Watson P, Cordery PAA et al (2016) A randomized trial to assess the potential of different beverages to affect hydration status: development of a beverage hydration index. Am J Clin Nutr 103, 717-723 <https://doi.org/10.3945/ajcn.115.114769>
* McClung JP. Iron status and the female athlete. J Trace Elem Med Biol. 2012 Jun;26(2-3):124-6
* Pickering C, and Kiely J. Are the Current Guidelines on Caffeine Use in Sport Optimal for Everyone? Inter-individual Variation in Caffeine Ergogenicity, and a Move Towards Personalised Sports Nutrition. Sports Med 2017
* Phillips SM and Van Loon LJC. (2011) Dietary protein for athletes: From requirements to optimum adaptation. J Sport Sci 29 S29-S38. <https://doi.org/10.1080/02640414.2011.619204>
* Powers S, Nelson WB, Larson-Meyer E. Antioxidant and Vitamin D supplements for athletes: sense or nonsense? J Sports Sci. 2011; 29 Suppl 1:S47-55.
* Saris WHM, van Erp-Baart, Brouns F, et al (1989) Study on Food intake and Energy Expenditure During Extreme Sustained Exercise: The Tour de France. Int J Sports Med. 10 S26-31. DOI: [10.1055/s-2007-1024951](https://www.researchgate.net/deref/http%253A%252F%252Fdx.doi.org%252F10.1055%252Fs-2007-1024951?_sg%255B0%255D=QmUZu9f5VGQImoMq_Pw1y_uog8U3Rb3UJWjQDUjj7BZt68-kJMj5SyJObwYt3SMmgug4lpNVJQA7gfeAblKAeiJ3lw.lH82xV0p-bmZr0tOjebNA0KtL0HcVdCRY8qPjbRB8YLSlmG_Uszb_-FJttbPjkDOc-D4722t53HHGxX0hS-hKg)
* Spriet, LL (2014) Recent advances in sports nutrition. Sports Med. 2014, 44 Supplement 1:1-111.
* Spriet, LL (2014) Nutrition for training and performance. Sports Med. 2014, 44 Nov Supplement 2:113-194.
* Wilson J, Wilson GJ. Contemporary issues in protein requirements and

consumption for resistance trained athletes. J Int Soc Sports Nutr. 2006 Jun 5; 3:727.

Practical/Lab/Tutorial Work

Abstract Guidelines

An abstract for an Oral, Poster or Demonstrated Communication is intended to provide a means of communicating new work in progress, as well as completed work. The following guidelines are adapted from those used by the Physiological Society for Meetings Abstracts. Some of the advice they give on their website (www.physoc.org) is not as relevant to you since you are not presenting your own original data, but summarising the research findings of others.

* Your abstract must contain an informative title. This will be different from the topic that you have been allocated. Your name and institution.
* The text allowance for an abstract for this course is one side of A4 paper, with line and a half spacing, and your font size should not be less than 10 pt (your reference list may be in a slightly smaller size font as long as it is still legible). Use a clear font that is easy to read.
* There is no requirement to include full experimental protocols in your abstract. However, sufficient information must be given within the text, or by reference to published work, to indicate how the experiments were performed.
* The authors must include within the abstract a clear description of the results and all the appropriate data to support any conclusion they wish to make.
* Where references are included in the text, the author should make sure that these are listed correctly at the end of the abstract. If you are unsure as to how to cite references properly, please obtain a copy of Journal of Physiology to find out.
* If numerical data are presented as mean values, the standard deviation or standard error must be given, stating which is used; n values must also be given. If statistical significance is stated, then the statistical test must be named.
* All abbreviations must be explained within the text, except those that are listed in the online version of the Instructions to Authors for The Journal of Physiology (http://www.jphysiol.org/misc/abbreviationslist.pdf). Abbreviations should be those accepted in the field; new abbreviations should be avoided whenever possible. Authors are reminded that a large number of abbreviations within an abstract can detract from the sense.
* Tables and figures should be no larger than 8 cm X 8 cm. Please indicate the approximate position of the table or figure within the text, and also include an informative table heading or figure legend. Tables should not normally contain more than 30 values and graphs should not normally contain more than three curves
* Figures must be fully labelled. Axis labels and lettering on figures should be in a lower case sans serif typeface (8 point); use capital, italic letters (A, B, etc.) to
* If you have any queries about the layout/content of your abstract, then ask!

Practical/Lab Work

There will be two practical classes in the Health Science Building Applied Physiology research labs

1. Indirect VO2max testing and
2. Strength and Power Assessment

Practical classes will be assessed within Module 1: Applied Exercise Physiology and Module 2: Fatigue.

University Policies

Students are asked to make themselves familiar with the information on key education policies, available [**here**](https://www.abdn.ac.uk/staffnet/teaching/key-education-policies-for-students-11809.php). These policies are relevant to all students and will be useful to you throughout your studies.  They contain important information and address issues such as what to do if you are absent, how to raise an appeal or a complaint and how the University will calculate your degree outcome.

These University wide education policies should be read in conjunction with this programme and/or course handbook, in which School specific policies are detailed. These policies are effective immediately, for the 2023/24 academic year. Further information can be found on the [**University’s Infohub webpage**](https://www.abdn.ac.uk/students/) or by visiting the Infohub.

The information included in the institutional area for 2023-24 includes the following:

* Assessment
* Feedback
* Academic Integrity
* Absence
* Student Monitoring/ Class Certificates
* Late Submission of Work
* Student Discipline
* The co-curriculum
* Student Learning Service (SLS)
* Professional and Academic Development
* Graduate Attributes
* Email Use
* MyAberdeen
* Appeals and Complaints

Where to Find the Following Information:

C6/C7- University of Aberdeen Homepage > Students > Academic Life > Monitoring and Progress > Student Monitoriung (C6 & C7)

https://www.abdn.ac.uk/students/academic-life/student-monitoring.php#panel5179

Absences- To report absences you should use the absence reporting system tool on Student Hub. Once you have successfully completed and sent the absence form you will get an email that your absence request has been accepted. The link below can be used to log onto the Student Hub Website and from there you can record any absences you may have.

[Log In - Student Hub (ahttps://www.abdn.ac.uk/studenthub/loginbdn.ac.uk)](https://www.abdn.ac.uk/studenthub/login)

Submitting an Appeal- University of Aberdeen Homepage > Students > Academic Life > Appeals and Complaints

https://www.abdn.ac.uk/students/academic-life/appeals-complaints-3380.php#panel2109

Academic Language & Skills support

For students whose first language is not English, the Language Centre offers support with Academic Writing and Communication Skills.

Academic Writing

* Responding to a writing task: Focusing on the question
* Organising your writing: within & between paragraphs
* Using sources to support your writing (including writing in your own words, and

citing & referencing conventions)

* Using academic language
* Critical Thinking
* Proofreading & Editing

Academic Communication Skills

* Developing skills for effective communication in an academic context
* Promoting critical thinking and evaluation
* Giving opportunities to develop confidence in communicating in English
* Developing interactive competence: contributing and responding to seminar discussions
* Useful vocabulary and expressions for taking part in discussions

More information and how to book a place can be found here

Medical Sciences Common Grading Scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grade | Grade Point | % Mark | Category | Honours Class | Description |
| A1 | 22 | 90-100 | Excellent | First | • Outstanding ability and critical thought • Evidence of extensive reading • Superior understanding •The best performance that can be expected from a student at this level |
|  |
| A2 | 21 | 85-89 |  |
|  |
| A3 | 20 | 80-84 |  |
|  |
| A4 | 19 | 75-79 |  |
|  |
| A5 | 18 | 70-74 |  |
|  |
| B1 | 17 | 67-69 | Very Good | Upper Second | • Able to argue logically and organise answers well  • Shows a thorough grasp of concepts  • Good use of examples to illustrate points and justify arguments  • Evidence of reading and wide appreciation of subject |  |
|  |
| B2 | 16 | 64-66 |  |
|  |
| B3 | 15 | 60-63 |  |
|  |
| C1 | 14 | 57-59 | Good | Lower Second | • Repetition of lecture notes without evidence of further appreciation of subject • Lacking illustrative examples and originality • Basic level of understanding |  |
|  |
| C2 | 13 | 54-56 |  |
|  |
| C3 | 12 | 50-53 |  |
|  |
| D1 | 11 | 47-49 | Pass | Third | • Limited ability to argue logically and organise answers • Failure to develop or illustrate points • The minimum level of performance required for a student to be awarded a pass |  |
|  |
| D2 | 10 | 44-46 |  |
|  |
| D3 | 9 | 40-43 |  |
|  |
| E1 | 8 | 37-39 | Fail | Fail | • Weak presentation • Tendency to irrelevance • Some attempt at an answer but seriously lacking in content and/or ability to organise thoughts |  |
|  |
| E2 | 7 | 34-36 |  |
|  |
| E3 | 6 | 30-33 |  |
|  |
| F1 | 5 | 26-29 | Clear Fail | Not used for Honours | • Contains major errors or misconceptions • Poor presentation |  |
|  |
| F2 | 4 | 21-25 |  |
|  |
| F3 | 3 | 16-20 |  |
|  |
| G1 | 2 | 11-15 | Clear Fail/Abysmal |  | • Token or no submission |  |
|  |
| G2 | 1 | 1-10 |  |
|  |
| G3 | 0 | 0 |  |
|  |

Course Timetable SR4007: 2023-2022

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date | Time | Place | Subject | Session | Staff |
| Week 8 | | | | | |
| Mon 18 Sep | 13:00-14:00 | FH 1.143 | Introduction to course: Introduction to Honours | Lecture | DB |
| Mon 18 Sep | 14:00-15:00 | 1.143 | Introductory Lecture - Module 1: Applied Physiology | Lecture | MES |
| Mon 18 Sep | 16:00-17:00 | Suttie lecture theatre | Honours Project discussion | Lecture | DS |
| Tue 19 Sep |  |  |  |  |  |
| Wed 20 Sep | 09:30-11:30 | Teaching hub facility | Assessment of strength and power production | Practical | JG |
| Thu 21 Sep |  |  |  |  |  |
| Fri 22 Sep | 14:00-17:00 | FH 1.032/1.033 | Interim report and troubleshooting | Tutorial | MES |
| Week 9 | | | | | |
| Mon 25 Sep | 15:00-16:00 | FH 2.054 | Literature search skills and techniques | Tutorial | MB |
| 16:00-17:00 | 2.054 | Research Methods: Experimental design and analysis | Lecture | DB/JG |
| Tue 26 Sep |  |  |  |  |  |
| Wed 27 Sep | 10:00-11:00 | Suttie lecture theatre | Citing and Referencing | Lecture | DAS |
| Wed 27 Sep | by 14:30 |  | Submit abstract Online (1) | n/a | n/a |
| Thu 28 Sep |  |  |  |  |  |
| Fri 29 Sep | 14:00-17:00 | 1:032/033 | Seminar presentation and discussion (1) | Assess | MES |
| Week 10 | | | | | |
| Mon 02 Oct | 15:00-16:00 | 1.143/44 | Introductory Lecture - Module 2: Limitations to physical capacity during exercise and the causes of fatigue | Lecture | DB |
| Tue 03 Oct |  |  |  |  |  |
| Wed 04 Oct |  |  |  |  |  |
| Thu 05 Oct |  |  |  |  |  |
| Fri 06 Oct | 14:00-16:00 | STHF | Fatigue in action! | Practical | DB |
| Week 11 | | | | | |
| Mon 09 Oct | 15:00-17:00 | 1.143/44 | Interim report and troubleshooting (2) | Tutorial | DB |
| Tue 10 Oct |  |  |  |  |  |
| Wed 11 Oct | by 14:30 |  | Submit abstract Online (2) | n/a | n/a |
| Thu 12 Oct |  |  |  |  |  |
| Fri 13 Oct | 14:00-17:00 | 1.032/1.033 | Seminar presentation and discussion (2) | Assess | DB |
| Week 12 | | | | | |
| Mon 16 Oct | 15:00-17:00 | 1.032/1.033 | Introductory lecture - Module 3: Pharmacology | Lecture | DAS |
| Tue 17 Oct |  |  |  |  |  |
| Wed 18 Oct |  |  |  |  |  |
| Thu 19 Oct |  |  |  |  |  |
| Fri 20 Oct | 14:00-16:00 | 1.032/1.033 | Interim report and troubleshooting (3) | Tutorial | DAS |
| Week 13 | | | | | |
| Mon 23 Oct | 15:00-17:00 | 1.032/1.033 | Introductory lecture - Module 4: Comparative physiology, athletes of the animal world | Lecture | DB |
| Tue 24 Oct |  |  |  |  |  |
| Wed 25 Oct | by 14:30 |  | Submit abstract Online (3) | n/a | n/a |
| Thu 26 Oct |  |  |  |  |  |
| Fri 27 Oct | 14:00-17:00 | 1.032/1.033 | Seminar presentation and discussion (3) | Assess | DAS |
| Week 14 | | | | | |
| Mon 30 Oct | 15:00-17:00 | 1.032/1.033 | Interim report and troubleshooting (4) | Tutorial | DB |
| Tue 31 Oct |  |  |  |  |  |
| Wed 1 Nov |  |  |  |  |  |
| Thu 2 Nov |  |  |  |  |  |
| Fri 3 Nov | 14:00-15:00 | 1.032/1.033 | Timed essay (4) | Assess | DB |
| Week 15 | | | | | |
| Mon 6 Nov | 15:00-17:00 | 1.032/1.033 | Introductory lecture - Module 5: Satellite cells | Lecture | MES |
| Tue 7 Nov |  |  |  |  |  |
| Wed 9 Nov |  |  |  |  |  |
| Thu 9 Nov |  |  |  |  |  |
| Fri 10 Nov | 14:00-17:00 | 1.032/1.033 | Interim report and troubleshooting (5) | Tutorial | MES |
| Week 16 | | | | | |
| Mon 13 Nov | 15:00-17:00 | 1.032/1.033 | Introductory lecture - Module 6: Nutrition | Lecture | DB |
| Tue 14 Nov |  |  |  |  |  |
| Wed 15 Nov | by 14:30 |  | Submit abstract Online (5) | n/a | n/a |
| Thu 16 Nov |  |  |  |  |  |
| Fri 17 Nov | 14:00-17:00 | 1.032/1.033 | Seminar presentation and discussion (5) | Assess | MES |
| Week 17 | | | | | |
| Mon 20 Nov | 14:00-17:00 | 1.039 | Interim report and troubleshooting (6) | Tutorial | DB |
| Tue 21 Nov |  |  |  |  |  |
| Wed 22 Nov | by 14:30 |  | Submit abstract Online (6) | n/a | n/a |
|  | 09:00-11:00 | FHLT3 | Honours Project Allocations |  | DS |
| Thu 23 Nov |  |  |  |  |  |
| Fri 24 Nov | 14.00-16.00 | 1.032/1.033 | Seminar presentation and discussion (6) | Assess | DB |
|  |  | Week 18 – NO TEACHING (CONSOLIDATE INTO 10 WEEKS) | |  |  |
| Mon 27 Nov | 09:00-11:00 | 1:039 | Wash Up/Exam Preparation | Tutorial | DB |
| Tue 28 Nov |  |  |  |  |  |
| Wed 29 Nov |  |  |  |  |  |
| Thu 30 Nov |  |  |  |  |  |
| Fri 1 Dec |  |  |  |  |  |
| Week 19 – NO TEACHING (CONSOLIDATE INTO 10 WEEKS) | | | | | |
| Mon 4 Dec |  |  |  |  |  |
| Tue 5 Dec |  |  |  |  |  |
| Wed 6 Dec |  |  |  |  |  |
| Thu 7 Dec |  |  |  |  |  |
| Fri 8 Dec |  |  |  |  |  |

STAFF

|  |
| --- |
| Dr Derek Ball (DB), Medical Sciences (Course Co-ordinator) |
| Ms Mel Bickerton (MB), Med Sch Lib |
| Dr Jenny Gregory (JG), Medical Sciences |
| Dr Derryck Shewan (DS), Medical Sciences |
| Dr Michael E Scholz (MES) Medical Sciences |
| Prof Derek Scott (DAS), Medical Sciences |

Campus Maps - Foresterhill



Polwarth Floor Plans

Diagram, schematic

Description automatically generated

Diagram

Description automatically generated

Diagram

Description automatically generated