Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	SES607
Module Title	Exploring Extremes: Human Physiology in Extreme Environments
Level	6
Credit value	20
Faculty	FSLS
HECoS Code	100433
Cost Code	GASP
Pre-requisite module	N/A

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
BSc (Hons) Sport & Exercise Science	Optional

Breakdown of module hours

Learning and teaching hours	14 hrs
Placement tutor support hours	0 hrs
Supervised learning hours e.g. practical classes, workshops	10 hrs
Project supervision hours	0 hrs
Active learning and teaching hours total	**24** hrs
Placement hours	0 hrs
Guided independent study hours	176 hrs
Module duration (Total hours)	**200** hrs

Module aims

- To understand the physiological mechanisms underlying adaptation to extreme environmental conditions, such as high altitude, extreme temperatures, and deep-sea pressures.
- To analyse the role of the cardiovascular, respiratory, and thermoregulatory systems in maintaining homeostasis in extreme environments.
- To apply knowledge of physiological responses to extreme environments in designing strategies for mitigating risks and optimizing performance in challenging conditions.

Module Learning Outcomes

At the end of this module, students will be able to:

1	Evaluate the acute responses of human physiology when exposed to extreme environments.
2	Evaluate the chronic adaptations of human physiology when exposed to extreme environments.
3	Critically evaluate the use of adaptation strategies used in preparation of undertaking exercise in extreme environments.
4	Critically analyse physiological information from a fictitious case study.
5	Propose suitable adaptation strategies for managing and optimizing performance in extreme environments.
6	Communicate information effectively to non-specialist audiences.

Assessment

Indicative Assessment Tasks:
This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Coursework - Students will be given a real-world scenario involving individuals or groups facing physiological challenges in extreme environments (e.g., mountaineers, deep-sea divers, ultra runners). Students must analyse the case(s), identify relevant physiological principles, and propose strategies for managing and optimizing performance in these environments. The case study findings will be presented in poster format.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1 - 6	Coursework	1500 words	100	N/A

Derogations

N/A

Learning and Teaching Strategies

A blend of lectures, practicals and workshops are the main learning and teaching strategies employed on this module. In line with the University Active Learning Framework, students

will be provided with short pre-recorded content prior to each practical laboratory session which will outline the focus of the practical skills that will be developed.

Welsh Elements

The programmes will be delivered through the medium of English. Students are entitled to submit assessments in the medium of Welsh. If students wish to converse in Welsh, they will be assigned a Welsh speaking personal tutor. Students will be sign posted to relevant opportunities via the VLE and MS Teams page.

Indicative Syllabus Outline

- Altitude
- Thermoregulation
- Hydration and fluid loss
- Overtraining
- Circadian rhythms
- Extreme sporting events/challenges
- Reliability and validity

Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

Gunga, H-A. *Human physiology in extreme environments*. (2020). 2nd ed. Amsterdam: Academic Press.

Other indicative reading

Périard, J. D. Racinais, S. (2019). H*eat Stress in Sport and Exercise: Thermophysiology of Health and Performance*. Switzerland: Springer.

Hussey, K. D. (2023). Timeless spaces: Field experiments in the physiological study of circadian rhythms, 1938–1963. *History and Philosophy of the Life Sciences*, 45(17), DOI: https://doi.org/10.1007/s40656-023-00571-w.

Périard, J. D. Eijsvogels, T. M. H. Daanen, H. A. M. (2021). Exercise under heat stress: thermoregulation, hydration, performance implications, and mitigation strategies. *Physiological Reviews*, 101(4), pp. 1873-1979.

Armstrong, L. E. Bergeron, M. F. Lee, E. C. Mershon, J. E. Armstrong, E. M. (2022). Overtraining Syndrome as a Complex Systems Phenomenon. *Frontiers in Network Physiology*, 1(794392), DOI: https://doi.org/10.3389/fnetp.2021.794392.

Administrative Information

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