Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	SES703
Module Title	Performance Biomechanics
Level	7
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
MSc Sport & Exercise Sciences (Sport Performance Science)	CORE

Breakdown of module hours

Learning and teaching hours	11 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	**21** hrs
Placement hours	0 hrs
Guided independent study hours	179 hrs
Module duration (Total hours)	200 hrs

Module aims

This module aims to provide students with the opportunity to investigate advanced data collection principles through the application of underpinning biomechanical principles. This process will allow the student, through the collection and interpretation of both 2D and 3D motion analysis, to understand what limits and promotes sporting performance.

Module Learning Outcomes

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

1	Use effective data collection techniques when working with an individual completing a sporting activity.
2	Critically evaluate a sporting activity utilising biomechanical principles.
3	Establish advanced strategies for performance development based upon biomechanical principles.
4	Demonstrate advanced skill set in delivering feedback to individual performing dynamic activity.

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.

Assessment 1 – Practical: This will be a practical assessment where students will collect 3D data of a specific sporting activity from a suitable individual. Students will have 90 minutes to complete the task practical task and in doing so will demonstrate best practice in both use of equipment and interaction with the individual under test.

Assessment 2 – Written Assignment: Based upon data collected from assessment 1, students will demonstrate their ability to critically evaluate information through the employment of biomechanical principles and once completed establish appropriate strategies whereby performance could be improved. Students will be expected to utilise existing research to support their interpretation and subsequent interventions and present this as a written assignment.

Assignment 3 – Report: Students will be expected to generate (based upon assessment 1) a report suitable for the application of feedback to the individual tested. This report will be made available through an online portal, providing suitable information that informs the participant.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1	Practical	90 minutes	25%	N/A
2	2 & 3	Written Assignment	1500 words	50%	N/A
3	4	Report	1500 words	25%	N/A

Derogations

N/A

Learning and Teaching Strategies

A blended learning approach will be used for the delivery of this module. This will incorporate synchronous and asynchronous content for lectures whilst workshops will be delivered on campus and face-to-face. Teaching hours will be split equally between lectures and workshops.

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. Support can also be made available for Welsh language students via Coleg Cymraeg Cenedlaethol where students can present their research at their conferences through the Welsh Language. Students will be sign posted to relevant opportunities via the VLE and MS Teams page.

Indicative Syllabus Outline

- Procedures for collecting human kinetic and kinematic data (best practice): 2D motion analysis, 3D motion analysis, force platforms.
- The human machine.
- Performance and Clinical Biomechanics.
- Limitations of human movement.
- Understanding Kinetic and Kinematic data (linear).
- Understanding Kinetic and Kinematic data (angular).
- Contrasting quantitative and qualitative biomechanics.

Indicative Bibliography:

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

Essential Reads

Oomens, C., Brekelmans, M., Loerakker, S. and Baaijens, F. (2018). *Biomechanics: Concepts and Computation. 2nd ed.* Cambridge: Cambridge University Press.

Other indicative reading

Horwood, A. (2023), *Clinical Biomechanics in Human Locomotion: Origins and Principles*. London: Academic Press

Grimshaw, P., Cole, M., Burden, A. and Fowler, N. (2019). *Instant Notes in Sport and Exercise Biomechanics. 2nd ed.* London: Routledge.

Nunome, H., Hennig, E. and Smith, N. (eds.) (2017). *Football Mechanics*. London: Routledge:

Navarro, E., Navandar, A., Viega, S. and Ferrer, A.S.J. (2021). *Applied Biomechanics: Sport Performance and Injury Prevention*. Switzerland: MDPI.

Elphinston, J. (2019). *The Power and the Grace: A Professional's Guide to Ease and Efficiency of Movement.* Scotland: Handspring Publishing Ltd.

Administrative Information

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