Module Definition Form (MDF)

Module code: MOD005681	**Version:** 5 **Date Amended:** 14/Sep/2020

1. Module Title
Biomechanics: Analysis of Motion

2a. Module Leader
Andrew Morrison

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

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

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:	Sport and Exercise Science Strength and Conditioning with Rehabilitation		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

This module extends the L5 module Practical Competencies in Biomechanics, further developing your understanding of force plates for data capture and analysis, and extends your understanding of motion analysis. You will be taught in a collaborative learning environment, engaging with other students, working in small groups to answer questions or work on mini tasks set in the lecture, seminar or computer session. The module content is focused on the initiation and development of motion in terms of both the internal forces produced by the musculoskeletal system and the external forces acting on the body. In order to understand human movement, you will explore the ground reaction force in depth. You will then see how the concepts of internal forces, the external net force and mass and acceleration are used to explain movement patterns. That will enable you to appreciate the importance of torque, momentum and impulse and to use these quantities to critically analyse a sporting action. This module content will also focus on the analysis of gait, a key skill that all Biomechanists should possess. The fundamental principles of gait analysis will be explored in a theoretical and practical manner. You (the student) will also gain sufficient experience to recognise differences in gait (and force) patterns between normal and pathological gaits. Throughout the module you will use force plates and motion analysis to investigate, analyse and appraise human movement. You will study and explore the content of the module in a series of lectures, seminars and experimental sessions. This will enable you to further develop both your scientific skills and your transferable skills such as IT, numeracy and communication.

6b. Outline Content

• Force plates

• Newton's 3 laws

• Momentum and Impulse

• Potential and Kinetic Energy

• Ground reaction force

• Fundamental principles of gait analysis

• Normal and pathological gaits

6c. Key Texts/Literature

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

6d. Specialist Learning Resources

2-D and 3-D motion analysis systems along with accompanying software,

Force plate system along with accompanying software

Computer facilities

Cambridge Centre for Sport and Exercise Sciences Laboratory

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	Explain the linear kinematics and kinetics underpinning human locomotion
2	Knowledge and Understanding	Apply mathematical formulae and concepts used in the biomechanical analysis of human movement
3	Intellectual, practical, affective and transferrable skills	Present analysed information acquired from the measurement and assessment tools in order to give a critical insight into human movement

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	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	1-3	Lectures 2 hours per week
Other teacher managed learning	12	1-3	Seminar consisting of computer, lab or practical based session 1 hr x 12 weeks
Student managed learning	114	1-3	Completion of weekly readings, tasks and preparation for assessments
TOTAL:	150		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-3	100 (%)	Fine Grade	30 (%)

Portfolio of coursework to include written report submission and in-class assessment (3000 word equiv.)

Assessment components for Element 010

Component No.	Assessment Title	Submission Method	Weighting (%)	Components needed for Mark Calculation?
010/1	In-class test	Scheduled Activity: Timetabled assessment task	20 (%)	All
010/2	Written Assignment	Canvas	80 (%)	

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]