

MODULE DESCRIPTOR

MODULE TITLE	SPORTS BIOMECHANICS		
MODULE CODE	XS2100 (L5)	CREDIT VALUE	20 UK CREDITS / 10 ECTS
SCHOOL	SCHOOL OF SCIENCES		

MODULE AIMS

The module aims include the following:

- (a) To model and refine sport performance and technique using the application of Biomechanical principles.
- (b) To investigate the role of material properties and design associated with their sporting applications and injury prevention.
- (c) To investigate the manipulation of forces and sports performance including the application of Fluid Dynamics.
- (d) To introduce the students to qualitative analysis of sporting activities and develop analytical and experimental skills.

MODULE CONTENT

Indicative syllabus content:

Application of Kinetics

Definition of force and stress and the application of mechanical load. Investigating the relationship between load and stress. Application and effect of loads on major joints of the body. Solving problems using mechanical principles.

Application of Material science to sporting performance and injury

Material properties and moduli. Load bearing structures, strain and stress. Application of material science to Biomaterial performance, i.e. ligament, tendon, bone. Viscoelastic properties and response to loading

Manipulation of Forces and Sports performance

Application of impulse and momentum (e.g. Sprint start, Take-off forces). Manipulation of forces to enhance performance and prevent injury. Angular Momentum and the interplay between angular velocity and Moment of inertia in various sports applications.

Fluid Mechanics

System definitions including viscosity, motion and Reynold's number. Motion of fluids and motion through fluids. Laminar and Turbulent flow. Bernoulli's Equation, the Magnus effect and performance. Drag effects, drag forces, drag co-efficient.

Information Technology

Use of software, e.g. spreadsheets for data analysis. Use of appropriate motion sensing and force analysis equipment.

Biomechanical Analysis in Sporting performance

Introduction to laboratory techniques and biomechanical analysis. Use of biomechanical measuring techniques in the biomechanics laboratory. Practical sessions and observations of sporting performance and techniques.

INTENDED LEARNING OUTCOMES

On successful completion of this module a student will be able to:

1. Identify and evaluate various material properties and their sporting application.
2. Model and analyse the manipulation of mechanical principles/loads and their effect on performance.
3. Interpret and evaluate following research and review of appropriate literature.
4. Analyse problems, perform calculations and formulate solutions.

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5. Observe, record and analyse test/practical procedures.
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TEACHING METHODS

The Module will be delivered using active workshops, Tutorials and Question and answer sessions accompanied by numerous practical laboratories. Private study will also be an integral part of the module. Tutorial sessions will be used to develop mathematical skills and applications of the concepts. An application-based assignment will allow the student to investigate the deeper significance of the philosophies in the context of Sport and Exercise Science. Supporting literature and other relevant resources will also be made available online via Blackboard.

ASSESSMENT METHODS

This module is assessed through a lab report and an examination.