Liverpool John Moores University

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Title:	BIOMECHANICS
Status:	Definitive
Code:	**6506ICBTBE** (129112)
Version Start Date:	01-08-2021
Owning School/Faculty:	Pharmacy & Biomolecular Sciences
Teaching School/Faculty:	ICBT, Colombo

Team	Leader
Katie Evans	Y

Academic Level:	FHEQ6	**Credit Value:**	20	**Total Delivered Hours:**	47
Total Learning Hours:	200	**Private Study:**	153		

Delivery Options
Course typically offered: Semester 2

Component	Contact Hours
Lecture	30
Practical	6
Tutorial	9

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Examination	70	2
Report	Report	Simulation	30	

Aims

The module provides an overview of the structure and function relationships in tissues and organs; application of stress and strain analysis to biological tissues; analysis of forces in human function and movement; energy and power in human activity; introduction to modelling viscoelasticity of tissues.

Learning Outcomes

After completing the module the student should be able to:

1	Compare the general characteristics, material properties, appropriate constitutive model, and adaptation potential for tissue and organs studied.
2	Justify relationships between structure and function in tissues and the implications/ importance of these relationships.
3	Select the appropriate viscoelasticity model for the mechanical behaviour of a given biological tissue.
4	Analyse the forces at skeletal joints and the stresses and strains in biological tissues, given the loading conditions and material properties.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Examination	1	2	3
Simulation	4		

Outline Syllabus

General characteristics, material properties, appropriate constitutive model, and adaptation potential for tissue and organs studied
Musculoskeletal anatomy, basic statics and joint mechanics (elbow, shoulder, spine, hip, knee, ankle)

Relationships between structure and function in tissues and the implications/ importance of these relationships
Structure and function of tissues: liver, heart, lung, kidney tissues, fluid mechanics and modelling of blood flow through vessels

Appropriate viscoelasticity model for the mechanical behaviour of a given biological tissue
Introduction to viscoelasticity and comprehensive review, creep and stress behaviour

Stresses and strains in biological tissues, given the loading conditions and material properties
Stress and strains in various biological tissues, creep and stress relaxation behaviour for a basic viscoelastic material model

Liner and angular kinematics
Basic dynamics to human motion: review of linear and angular kinematics; kinetic equations of motion; work & energy methods; momentum methods.

Application of biomechanics
Application of biomechanics in physical education, sport medicine & rehabilitation.

Learning Activities

Students will be supported in their learning, to achieve the above learning outcomes, in the following ways:
Mathematical and analytical skills are acquired through lectures, seminars, tutorials and group work.
Lecture notes and module guide in the form of comprehensive guidance notes; include theory examples and Q & A will guide to achieve the outcome.
MATLAB computer simulation used to simulate the mathematical function to cover all the learning outcomes.

Notes

This module is part of the Level 6 of the BEng(Hons) in Biomedical Engineering