UNIVERSITY of BRADFORD

Module Descriptor

Biomechanics and Human Biodynamics

Module Code:	MHT5006-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Biomedical and Electronics Engineering
Subject Area:	Medical and Healthcare Technology
FHEQ Level:	FHEQ Level 5
Module Leader:	Dr Mansour Youseffi

Additional Tutors:
Dr John Buckley

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	36
Tutorials	24
Laboratory	12
Directed Study	128

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

The biomechanics part of this module (semester 1) aims to provide an overview of how the human body experiences forces in static and dynamic situations, and how gait and posture is analysed and evaluated.

The human biodynamics part of this module aims to carry out the most important physiological measurements for the clinical assessment of human body including blood pressure, electrocardiograph, spirometry (lung/pulmonary function), peak expiratory flow,

skin analysis (moisture, oil and softness/roughness), metabolic rate and kidney, i.e. to measure metabolic rate at rest and for exercising subjects and estimate of body composition (e.g. BMI, % fat, etc).

Outline Syllabus

Biomechanics (semester 1): Gait analysis - systematic description of human locomotion, including clinical applications and identification of pathology. Kinematic and kinetic techniques for quantifying gait and posture. Inverse dynamics modelling for the calculation of joint kinetics (i.e. joint reaction forces and moments) in for example, the stance and swing phases of the gait cycle. Interpret kinematic and kinetic data in the context of describing gait and posture.
Human Biodynamics (semester 2): The most important physiological measurements for the clinical assessment of human body including blood pressure, electrocardiograph, spirometry (lung/pulmonary function), peak expiratory flow, skin analysis (moisture, oil and softness/roughness), metabolic rate and kidney, i.e. to measure metabolic rate at rest and for exercising subjects, to estimate body composition, i.e. to measure body mass index (BMI), body fat content and lean body mass using the bioelectric impedance (BI) technique, Oxygen-haemoglobin measurement using the pulse oximeter and to examine urine and blood with normal values only by assessment. Finally to study the flow behaviour of common substances such as polymer melts, body fluids such as synovial fluid, blood and clotted blood.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Apply methods for analysing and quantifying human posture and locomotion (gait); including use of forceplatforms, motion capture systems, biomechanical modelling approaches.

2 Apply biomechanical theory to gain insights into human balance and locomotion.

3 Manage, present and interpret biomechanical data.
Solve problems systematically using the scientific method.

Learning, Teaching and Assessment Strategy

Concepts are introduced using formal lectures. Deeper understanding is developed during tutorial classes, and further enhanced using the laboratory class
The biomechanics (JB) part of the module will be assessed via a two-hour written classroom test including one compulsory question based on practical aspects in week 12. Formative feedback will occur informally during the weekly tutorials. Using worked examples, you will have opportunity to review and continually update your understanding of performing biomechanical modelling calculations, and you will be given tutorial questions with model answers to further your understanding. You will receive formative feedback on a laboratory practical write-up you are required to submit. Feedback regarding common errors and/or deficiencies in the practical write-up will be posted on to Blackboard and then further highlighted and discussed during a tutorial session. This session will also provide you opportunity to discuss areas you have misunderstood.

For human biodynamics (MY) part of this module (semester two) the learning outcomes are assessed using formal examination (70%) and laboratory reports (30%). This is conducted in accordance with the normal university rules.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Referral	Examination - closed book	2 hour closed book exam	0 hours	100%	Yes
Summative	Examination - closed book	Examination - closed book	2 hours	35%	Yes
Formative	Coursework	Lab write-up	500 words	%	No
Summative	Coursework	Lab write-up	1500 words	15%	No
Summative	Classroom test	Class-based test	2 hours	50%	No

Legacy Code (if applicable)

ENG2308L

Reading List

To view Reading List, please go to **rebus:list**.