UNIVERSITY of BRADFORD

Module Descriptor

Mathematics for Clinical Technologists

Module Code:	ENM4005-B
Academic Year:	2018-19
Credit Rating:	20
School:	Engineering and Informatics (Faculty-wide)
Subject Area:	Engineering Mathematics
FHEQ Level:	FHEQ Level 4

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	48
Tutorials	24
Directed Study	128

Availability Periods

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

Module Aims

The aim of this module is to make students familiar with basic understanding of numerical mathematics as applied to mechanical and biomechanics suitable for the Clinical Technology students. This module focuses on mathematical analysis of human motion including quantitative maths applied for mechanical techniques for the analysis of human movement.

Outline Syllabus

Week 1-2
- Introduction to applied maths for biomechanics,
- Application of mathematics in biomechannics
-Collection of mathematical kinematic data (Unit of measuments, vectors and scalars)
- Numerical examples and theories of maths

Week 3-4
- Mathematics of position and displacment
- Mathematics of velocity and speed
- Mathematics of Acceleration
- More Numerical examples
Week 5-6
- Mathematics of Speed and Acceleration (Graphical Examples)
- Linear kinematics of walikng and running
- Projectile motion
- Equations of constant acceleration
- Numerical examples
Week 7-8
- Mathematics of Angular motion (Angle and units of measurments)
- Types pf angels (Absolute and relative angels)
- Lower exteremity joint angels (hip, knee, ankle and rearfoot angels)
- Representive of angular motion vectors
- Calculation of Angular Acceleration
- Numerical examples
Week 9-10
- Relationship between mathematics of angular and linear motions
- Angular kinematics of walikng and running
- Numerical examples
Week 11-12
- Mathematics of Force
- Laws of motions (Law I, II and III)
- Types of forces (noncontact and contact forces)
- Representation of forces acting on a system
- Numerical examples
Week 13-14
- Analysis using Newton Laws of Motion
- Numerical examples
Week 15-16
- Special force applications (Pressure and Centripetal force)
- Linear mathematics applied to kinetics of locomotion
- Numerical examples
Week 17-18
- Angular Kinetics
- Calculation of Torque of moment of force
- Newton’s Laws of Motion (Angular analogs)
- Numerical examples
Week 19-20
- Centre of mass
- Centre of mass calculations
- Calculation of Rotation and Leverage
- Numerical examples
Week 21-22
- Types of Torque
- Numerical examples
Week 23
- Effect of torque applied over a distance
- Special Torque applications (Angular power and energy)
- Angular Kinetics of Locomotion
- Numerical examples

Week 24
- Review and Numerical examples

Module Learning Outcomes

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

1 Conduct basic numerical calculations which are essential for each undergratuate student to know.

2 Conduct a numberical calculation of velocity and acceleration using the first central differnce method.

3 Conduct a numerical calculation of the area under a parameter-tie curve as well as carry out the conversions for the calculation of lower extremity angles.

4 Solve quantitatives problems using basic mathematical and numerical techniques that employ angular kinematic principles and human movements. Students will learn basic numerical techniques related to human body and this will help them to be ready for other related modules in stage 2 and 3.

Learning, Teaching and Assessment Strategy

Key lectures will deliver core content, providing students with the opportunity to acquire the information to enhance their knowledge and understanding of subject (LO 1,2,3,4).
This will be complemented by many numerical examples and tutorials to allow students to apply this learning for future modules including biomechanics (LO3,4).
Directed study provides students with the opportunity to undertake guided reading and to develop their own portfolio of learning to enhance transferable skills and knowledge (LO 1,2,3,4).
Quizzes will help students to understand mathematical aspects of basic human movements. This will be done by interactive teaching sessions with many hands out and questions/answers (LO1,2,3).
Module material is blocked to assist self-paced learning. Principles, theory and practical calculation skills are developed in formal lectures, and practised in tutorials and calculator-based classes with continual reflection and oral feedback.
There will be formative assessments in the form of monthly quizzes followed by a set of summative assessment at the end of each semester:
1) Class tests (20%): Written classroom tests during the course will assess both the application of practical skills to the knowledge base of the module and the wider learning outcomes expressed in the descriptor (LO1,2).
2) Summative final exam (closed book) (80%): The formal examination will assess all the learning outcomes expressed in the descriptor (LO1,2,3,4).

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'

Summative	Examination - closed book	Examination - Closed Book	2 hours	80%	Yes
Summative	Classroom test	Classroom Test	1 hour	20%	No

Legacy Code (if applicable)

Reading List

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