



Unit Outline (Higher Education)

Institute / School: Institute of Health and Wellbeing

Unit Title: Introduction to Biomechanics

Unit ID: EXSCI1701

Credit Points: 15.00

Prerequisite(s): Nil

Co-requisite(s): Nil

Exclusion(s): Nil

ASCED: 069903

Description of the Unit:

This unit introduces students to key biomechanical concepts and terminology, with a focus on understanding the application of biomechanical principles to fundamental movements, sports techniques, recreational and exercise movement activities. This unit includes the examination of linear and angular kinematics and kinetics; fluid mechanics; and some biomechanical analysis techniques.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	■	■	✓	■	■	■

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Intermediate	■	■	■	■	■	■
Advanced	■	■	■	■	■	■

Learning Outcomes:

Knowledge:

- K1.** Describe the scope of scientific inquiry addressed by biomechanics and discuss how the discipline has contributed to advances in technology and improvements in performance.
- K2.** Identify and describe the planes and axes of motion associated with the human body.
- K3.** Appraise the differences between linear and angular kinematics and kinetics, using examples from human movement.
- K4.** Explain and apply Newtons laws of linear and angular motion, and gravitation.
- K5.** Discuss the effects various forces have on an object and how these forces can be manipulated in specific sports and/or human movements.
- K6.** Explain the term centre of gravity and the relationship between factors including centre of gravity, base of support, balance and stability.
- K7.** Identify the mechanical advantages associated with different types of levers and explain the concept of leverage within the human body.

Skills:

- S1.** Represent external forces using free body diagrams.
- S2.** Solve quantitative and qualitative biomechanical problems.
- S3.** Examine and critically evaluate the key biomechanical principles associated with a variety of sports settings, and communicate this information to peers.

Application of knowledge and skills:

- A1.** Participate in problem solving of biomechanical scenarios within laboratories.
- A2.** Apply the principles of biomechanical analysis of human movement in the context of exercise and activities of daily living.
- A3.** Apply biomechanical principles when conducting a qualitative and/or quantitative analysis of human movement.

Unit Content:

The following topics will be covered as principles and applied to a variety of sports and human movement contexts:

Introduction to biomechanics and its applications;
Forces;
Linear and angular motion, including Newtons Laws;
Projectile motion;
Work, power & energy;
Coefficient of restitution;
Levers & torque;
Centre of gravity;
Fluid mechanics;

Qualitative biomechanical analysis of human movement;
 Use and advancements in biomechanical technology.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, K4, K5, K6, K7, S1, S2, S3, A1, A2, A3	Attendance and participation in laboratory sessions to complete formative assessments of practical skills.	90% attendance required to satisfy ongoing formative assessments	Satisfactory/Unsatisfactory
K1, K2, K3, K4, K5, S2, A2	Completion of self-directed study of class content presented in the first half of the semester.	Mid-semester exam	20-40%
K1, K3, K4, K5, K6, K7, S3, A2, A3	Describe key biomechanical principles making links to sport and human movements, and/or activities of daily living and communicate this information via a group poster and presentation.	Laboratory project	20-40%
K1, K3, K4, K5, K6, K7, S2, A2, A3	Review of biomechanical principles presented in the entire unit to sports and human movement settings.	Final theory exam	40-60%

Adopted Reference Style:

APA ()

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