



PHTY3001

Biomechanics of Human Movement

Session 1, In person-scheduled-weekday, North Ryde 2024

Department of Health Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

Unit Convenor, Tutor

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Unit Convenor, Tutor

Darryl Hands

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Credit points

10

Prerequisites

110cp at 1000 level or above including ((HLTH108 or ANAT1001) and ((HLTH109 or ANAT1002) or (MEDI203 or MEDI2100)))

Corequisites

Co-badged status

Unit description

This unit will cover the basic principles of biomechanics and apply these to the analysis of human movement and the musculoskeletal system. This unit will integrate your understanding of mechanics with functional anatomy through the study of biomechanics of human locomotion (in two dimensions) and gross motor functions through the use of kinematics, kinetics, muscle function, work, and power. The mechanics of tissues in the musculoskeletal system will also be introduced and discussed in the context of injuries and exercise prescription. The basis of methods for assessing movement, both quantitative and qualitative, will also be introduced enabling basic practical analysis of common movements to be performed. Learning activities include lectures and hands-on laboratories.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

- ULO1:** Explain key terminology and basic biomechanical principles as they apply to human movement
- ULO2:** Demonstrate, through explanation, an understanding of how changes of movement patterns and techniques will influence the load on human tissues during movement
- ULO3:** Describe the biomechanical characteristics of walking and running in healthy people
- ULO4:** Analyse and interpret biomechanical data characterising human movement
- ULO5:** Discuss the mechanical properties of bones, muscles, tendons and ligaments
- ULO6:** Describe practical ways to measure common movements in a clinical and/or workplace settings

General Assessment Information

Grade descriptors and other information concerning grading are contained in the [Macquarie University Assessment Policy](#).

All final grades are determined by a grading committee, in accordance with the Macquarie University Assessment Policy, and are not the sole responsibility of the Unit Convenor.

Students will be awarded a final grade and a mark which must correspond to the grade descriptors specified in the [Assessment Procedure](#) (clause 128).

To pass this unit, you must demonstrate sufficient evidence of achievement of the learning outcomes, meet any ungraded requirements, and achieve a final mark of 50 or better.

Further details for each assessment task will be available on iLearn.

Late Submissions

Unless a Special Consideration request has been submitted and approved, a 5% penalty (OF THE TOTAL POSSIBLE MARK) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11.55pm. A 1-hour grace period is provided to students who experience a technical concern.

For example:

Number of days (hours) late	Total Possible Marks	Deduction	Raw mark	Final mark
1 day (1-24 hours)	100	5	75	70

2 days (24-48 hours)	100	10	75	65
3 days (48-72 hours)	100	15	75	60
7 days (144-168 hours)	100	35	75	40
>7 days (>168 hours)	100	-	75	0

For any late submissions of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

Assessment Tasks

Name	Weighting	Hurdle	Due
Mid-Semester Quiz	35%	No	During scheduled practical - Monday 08/04/2024
Movement/Skill Analysis	30%	No	Friday Week 11, 11:55pm
Final exam	35%	No	Central Exam Period

Mid-Semester Quiz

Assessment Type ¹: Examination

Indicative Time on Task ²: 25 hours

Due: **During scheduled practical - Monday 08/04/2024**

Weighting: **35%**

A quiz assessing content from the first half of the session.

On successful completion you will be able to:

- Explain key terminology and basic biomechanical principles as they apply to human movement
- Demonstrate, through explanation, an understanding of how changes of movement patterns and techniques will influence the load on human tissues during movement
- Analyse and interpret biomechanical data characterising human movement

- Discuss the mechanical properties of bones, muscles, tendons and ligaments
- Describe practical ways to measure common movements in a clinical and/or workplace settings

Movement/Skill Analysis

Assessment Type ¹: Presentation

Indicative Time on Task ²: 20 hours

Due: **Friday Week 11, 11:55pm**

Weighting: **30%**

Video presentation of a movement/skill analysis project

On successful completion you will be able to:

- Describe the biomechanical characteristics of walking and running in healthy people
- Analyse and interpret biomechanical data characterising human movement
- Describe practical ways to measure common movements in a clinical and/or workplace settings

Final exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 25 hours

Due: **Central Exam Period**

Weighting: **35%**

Invigilated exam held during central exam period

On successful completion you will be able to:

- Explain key terminology and basic biomechanical principles as they apply to human movement
- Demonstrate, through explanation, an understanding of how changes of movement patterns and techniques will influence the load on human tissues during movement
- Describe the biomechanical characteristics of walking and running in healthy people
- Analyse and interpret biomechanical data characterising human movement
- Discuss the mechanical properties of bones, muscles, tendons and ligaments
- Describe practical ways to measure common movements in a clinical and/or workplace

settings

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

As a student enrolled in this unit, you will engage in a range of online and face-to-face learning activities, including readings, online modules, videos and lectures. Details can be found on the iLearn site for this unit.

Recommended Readings

- Sports biomechanics: the basics: optimising human performance (2nd ed.) / Anthony J. Blazeovich
- Fundamentals of Biomechanics (2nd ed.) / Duane Knudson

Technology Used

Active participation in the learning activities throughout the unit **will require** students to have access to a tablet, laptop, or similar device. Students who do not own their own laptop computer may borrow one from the university library.

Unit Schedule

Topics covered in this unit include:

- Biomechanics overview
- Linear and angular kinematics
- 2-dimensional and 3-dimensional kinematic analysis
- Kinetics and forces
- Linear motion, energy, work, and power
- Angular motion
- Signal analysis and filtering
- Projectile motion
- Electromyography
- Occupational biomechanics
- Clinical biomechanics

- Running biomechanics

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

Changes made to this unit as a result of student and teaching staff feedback include:

- AT2 skill analysis has been changed from a written report to a video presentation
- More even weighting of assessment tasks - AT3 Final exam now 35% from 50%

Inclusion and Diversity

Social inclusion at Macquarie University is about giving everyone who has the potential to benefit from higher education the opportunity to study at university, participate in campus life and flourish in their chosen field. The University has made significant moves to promote an equitable, diverse and exciting campus community for the benefit of staff and students. It is your responsibility to contribute towards the development of an inclusive culture and practice in the areas of learning and teaching, research, and service orientation and delivery. As a member of the Macquarie University community, you must not discriminate against or harass others based on their sex, gender, race, marital status, carers' responsibilities, disability, sexual orientation, age, political conviction or religious belief. All staff and students are expected to display appropriate behaviour that is conducive to a healthy learning environment for everyone.

Professionalism

In the Faculty of Medicine, Health and Human Sciences, professionalism is a key capability embedded in all our courses.

As part of developing professionalism, students are expected to attend all small group interactive sessions including clinical, practical, laboratory, work-integrated learning (e.g., PACE placements), and team-based learning activities. Some learning activities are recorded (e.g., face-to-face lectures), however you are encouraged to avoid relying upon such material as they do not recreate the whole learning experience and technical issues can and do occur. As an adult learner, we respect your decision to choose how you engage with your learning, but we would remind you that the learning opportunities we create for you have been done so to enable your success, and that by not engaging you may impact your ability to successfully complete this unit. We equally expect that you show respect for the academic staff who have worked hard to develop meaningful activities and prioritise your learning by communicating with them in advance if you are unable to attend a small group interactive session.

Another dimension of professionalism is having respect for your peers. It is the right of every student to learn in an environment that is free of disruption and distraction. Please arrive to all learning activities on time, and if you are unavoidably detained, please join activity as quietly as possible to minimise disruption. Phones and other electronic devices that produce noise and other distractions must be turned off prior to entering class. Where your own device (e.g., laptop) is being used for class-related activities, you are asked to close down all other applications to avoid distraction to you and others. Please treat your fellow students with the utmost respect. If you are uncomfortable participating in any specific activity, please let the relevant academic know.

Unit information based on version 2024.02 of the [Handbook](#)