



# PHTY3001

## Biomechanics of Human Movement

Session 1, In person-scheduled-weekday, North Ryde 2022

*Department of Health Sciences*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

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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

### General Assessment Information

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, which corresponds to the grade descriptors specified in the [Assessment Procedure](#) (clause 128).

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

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

### Student 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 tutorials and laboratory-based practical sessions.

Furthermore, lectures and seminars are key learning activities that you are expected to attend throughout completion of your degree. While audio recordings and lecture slides may be made available following these large group sessions, it is important to recognise that such resources are a study aid - and should not be considered an alternative to lecture or seminar attendance. Echo360 recordings of live lectures do not always work and are not a substitute for in-person lecture attendance.

Students are required to attend a minimum of 80% of all noted compulsory activities. Students that do not meet this requirement may be deemed unable to meet expectations regarding professionalism, learning outcomes, and may be referred for disciplinary action (which may include exclusion from assessments and unit failure).

Similarly, as part of developing professionalism, students are expected to submit all work by the due date. Applications for assessment task extensions must be supported by appropriate evidence and submitted via [www.ask.mq.edu.au](http://www.ask.mq.edu.au). For further details please refer to the Special Consideration Policy available at <https://students.mq.edu.au/study/my-study-program/special-consideration>.

## Late Submission

All assignments which are officially received after the due date, and where no extension has been granted, will receive a 5% per day penalty including weekends and public holidays. If you submit the assessment task 10 days or more beyond the due date, without an approved extension, you will be awarded a maximum of 50% of the overall assessment marks. For example:

Due date	Received	Days late	Deduction	Raw mark	Final mark
Friday 14th	Monday 17th	3	15%	75%	60%
Friday 14th	Monday 24th	10	50%	75%	25%

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Mid-Semester Quiz</u>	20%	No	Week 6
<u>Movement/Skill Analysis</u>	30%	No	COB Friday of Week 11
<u>Final exam</u>	50%	No	Central Exam Period

### Mid-Semester Quiz

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 15 hours

Due: **Week 6**

Weighting: **20%**

Students will complete a quiz during a specified 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

## Movement/Skill Analysis

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **COB Friday of Week 11**

Weighting: **30%**

Written group report with group and individual components (Movement Analysis)

On successful completion you will be able to:

- Demonstrate, through explanation, an understanding of how changes of movement patterns and techniques will influence the load on human tissues during 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

## Final exam

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **Central Exam Period**

Weighting: **50%**

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
- Describe practical ways to measure common movements in a clinical and/or workplace

settings

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<sup>1</sup> 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.

<sup>2</sup> 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

### Unit Organisation

This is a 10 credit point unit run over a 13 week session; there are a mix of online lectures and in-person laboratories and tutorials. Specific information is available via the PHTY3001 iLearn site.

### Assumed knowledge

This unit builds on your learning in the previous undergraduate units particularly in the area of Anatomy; In particular, (HLTH108/9, ANAT1001/2) or (BIOL247, BIOL2220).

### Teaching and Learning Strategy

This unit will have a weekly on-line lecture and weekly in-person laboratory/tutorial n.b., refer to weekly schedule for specific timings and weeks where activities may not be scheduled due to assessments. Lectures will provide foundation knowledge important for understanding the basis of biomechanics of human movement. Laboratories/tutorials will allow for the demonstration, learning of practical skills, and discussion of topics relevant to Exercise Science and biomechanics. The teaching approach will be based on students developing a deep understanding of principles and the ability to independently solve problems, with the expectation that students can then translate this knowledge to different scenarios.

### Textbooks

The following textbook will be used in the teaching of this unit and the library hold an online copy of it:

**Sports biomechanics: the basics: optimising human performance / Anthony J. Blazeovich, 2nd ed., A & C Black Publishers: London**

Additionally the following two texts will be used to a lesser extent; the library also holds an online version:

**Fundamentals of Biomechanics / Duane Knudson, 2nd ed., Springer US: Boston, MA**

**The Comprehensive Textbook of Clinical Biomechanics / Jim Richards, 2nd ed., Elsevier**

An interactive laboratory manual is available for purchase. Further details are provided on iLearn.

## Readings

Readings may be referred to throughout the semester and a reference to these will be provided as needed.

## Attendance

All lectures and laboratories are scheduled in your individual timetable. You may make a request to your tutor to attend a different laboratory on a one-off basis for extenuating circumstances. Lectures are pre-recorded, attendance is expected at all laboratories/tutorials; failure to attend may impact your final results. It is the responsibility of the student to contact their tutor by email to inform tutors if they are going to be absent. The timetable for classes can be found on the University website at: <http://www.timetables.mq.edu.au/>.

## Technology and Equipment

### On-campus

The Exercise and Sports Science laboratories are located in the Macquarie University Sport and Aquatic Center (MUSAC). This teaching space is equipped with state of the art exercise and sports science equipment, audio-visual, and ICT equipment including iPads, internet connection, and multiple LCD screens. Students will use a range of specific equipment typically used in the assessment, management, and development of human physical performance.

### Off-campus

Should you choose to work off campus you will need to have access to a reliable internet connection in order to retrieve unit information & at times to submit assessment tasks via iLearn.

## Unit Schedule

Consult iLearn for the most up to date schedule.

## 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 \(https://students.mq.edu.au/su\)](https://students.mq.edu.au/su)

[upport/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>) 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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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 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/](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 since First Published

Date	Description
07/02/2022	Updated General Assessment Information