



# ESPS3001

## Biomechanics of Human Movement

Session 1, In person-scheduled-weekday, North Ryde 2025

*Department of Health Sciences*

### Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	4
<u>Delivery and Resources</u>	6
<u>Policies and Procedures</u>	6
<u>Inclusion and Diversity</u>	8
<u>Professionalism</u>	8

#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Jodie Wills

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Tim Doyle

Credit points

10

Prerequisites

120cp at 1000 level or above including (ANAT1001, ANAT1002, and ESPS1000)

Corequisites

Co-badged status

Unit description

This unit will cover the 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 to enable analysis of common movements.

## 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 biomechanical principles as they apply to exercise and sports science (Scientist and Scholar)

**ULO2:** Explain how changes in movement patterns and techniques will influence the load on human tissues during movement (Exercise Science Practitioner)

**ULO3:** Analyse and interpret biomechanical data characterising human movement (Exercise Science Practitioner)

**ULO4:** Discuss of the mechanical properties of bones, muscles, tendons and ligaments (Scientist and Scholar)

**ULO5:** Identify practical ways to measure common movements in a clinical and/or workplace settings (Professional)

## 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. You must also make a serious attempt at **all** assessment items.

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	20%	No	Week 7
Skill Analysis Report	30%	No	Friday 23rd May, Week 11, 11:55pm
Final Examination	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 7**

Weighting: **20%**

Mid-semester quiz.

On successful completion you will be able to:

- Explain key terminology and biomechanical principles as they apply to exercise and sports science (Scientist and Scholar)
- Explain how changes in movement patterns and techniques will influence the load on human tissues during movement (Exercise Science Practitioner)
- Analyse and interpret biomechanical data characterising human movement (Exercise Science Practitioner)
- Discuss of the mechanical properties of bones, muscles, tendons and ligaments (Scientist and Scholar)

### Skill Analysis Report

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

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

Due: **Friday 23rd May, Week 11, 11:55pm**

Weighting: **30%**

Written individual report detailing biomechanical analysis of human movement. Note analysis is conducted as part of a group.

On successful completion you will be able to:

- Explain key terminology and biomechanical principles as they apply to exercise and sports science (Scientist and Scholar)
- Explain how changes in movement patterns and techniques will influence the load on human tissues during movement (Exercise Science Practitioner)
- Analyse and interpret biomechanical data characterising human movement (Exercise Science Practitioner)
- Identify practical ways to measure common movements in a clinical and/or workplace settings (Professional)

## Final Examination

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

Indicative Time on Task <sup>2</sup>: 35 hours

Due: **Central Exam Period**

Weighting: **50%**

Final examination during central examination period.

On successful completion you will be able to:

- Explain key terminology and biomechanical principles as they apply to exercise and sports science (Scientist and Scholar)
- Analyse and interpret biomechanical data characterising human movement (Exercise Science Practitioner)
- Discuss of the mechanical properties of bones, muscles, tendons and ligaments (Scientist and Scholar)
- Identify practical ways to measure common movements in a clinical and/or workplace settings (Professional)

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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

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

- Blazeovich, Prof. A. J. (2017). *Sports Biomechanics: The Basics: Optimising Human Performance* (Third edition.). Bloomsbury Publishing Plc.
- Knudson, D. (2021). *Fundamentals of Biomechanics* (Third edition). Springer International Publishing AG.
- Richards, J. (2018). *The comprehensive textbook of clinical biomechanics* (ProQuest (Firm), Ed.; Second edition.). Elsevier.
- Winter, D. A. (2009). *Biomechanics and Motor Control of Human Movement*. Wiley.

### 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.

## 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 [connect.mq.edu.au](https://connect.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/>

## Academic Success

[Academic Success](#) 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 the [Service Connect Portal](#), 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.

## 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

Fitness to Practice (FTP) is the demonstration of professional competence, acceptable professional behaviour, freedom from impairment and compliance with course-specific requirements needed for a student to practice properly and safely throughout their course and to appropriately practice within a professional environment as a future Exercise Scientist.

Students undertaking the Bachelor of Exercise and Sports Science are required to demonstrate they meet requirements of the four attributes of FTP – Conduct, Performance, Health and Compliance throughout their entire program of study so that they can meet the requirements of the exercise science profession.

Students must also meet the inherent requirements to complete their degree, course, or unit and graduate. To meet the inherent requirements of the Bachelor of Exercise and Sport Science, full participation in practical classes which involve observation, manual handling, undertaking exercise for the purposes of instruction and demonstration is expected.



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.

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Unit information based on version 2025.02 of the [Handbook](#)