HESC2452

Movement Assessment and Instruction

Course Outline

Term 2, 2024

School of Health Sciences

Faculty of Medicine & Health

Table of Contents

1. Staff

Position	Name	Email	Consultation times and locations
Course Convenor	Imtiaz Desai	i.desai@unsw.edu.au	By appointment

2. Course information

Units of credit: 6

Pre-requisite(s): ANAT2451 (or both ANAT3131 and ANAT3141) and HESC2451 (or BIOM2451/SESC2451)

Teaching times and locations: see timetable https://timetable.unsw.edu.au/2024/HESC2452.html

2.1 Course summary

This course will equip you with knowledge and skills for assessing and instructing clients and patients in exercises and other movements. You will integrate concepts from biomechanics, functional anatomy, motor learning and skill acquisition in the analysis of exercises, work tasks and activities of daily living. You will apply your theoretical understanding of biomechanics and functional anatomy in practical analysis of movement, using both quantitative and qualitative approaches. The course will also cover aspects of exercise instruction and approaches to movement education. You will develop practical skills in teaching new or modified exercises, work tasks or activities of daily living, giving consideration to pedagogical theory in relation to instructing clients and patients regarding movement and exercise.

2.2 Course Aims

This course aims to:

1. Develop students' skills in integrating and applying concepts from biomechanics and functional anatomy.
2. Extend students' understanding of motor learning and instructional approaches for training people in movement tasks.
3. Develop students' skills in quantitative motion analysis techniques.
4. Introduce students more generally to educational theory and practice to support their professional development in being able to themselves train student clinicians in their future professional work.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Describe and demonstrate the appropriateness and effectiveness of a variety of teaching and feedback strategies for movement instruction and exercise delivery.
2. Demonstrate an understanding of the implications of individual differences on motor learning and skill acquisition.

3. Effectively communicate information to clients and patients in training and rehabilitation programs.
4. Demonstrate theoretical understanding and practical skills regarding the collection, graphical presentation and interpretation of quantitative motion analysis data.
5. Identify the biomechanical loads experienced by specific anatomical structures during different postures and movements and recognise when this poses a risk of injury.

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	LO Statement	Related Tasks & Assessment
CLO 1	Describe and demonstrate the appropriateness and effectiveness of a variety of teaching and feedback strategies for movement instruction and exercise delivery.	Movement Instruction Skills Assessment End of term exam
CLO 2	Demonstrate an understanding of the implications of individual differences on motor learning and skill acquisition.	Movement Instruction Skills Assessment End of term exam
CLO 3	Effectively communicate information to clients and patients in training and rehabilitation programs.	Movement Instruction Skills Assessment
CLO 4	Demonstrate theoretical understanding and practical skills regarding the collection, graphical presentation and interpretation of quantitative motion analysis data.	Laboratory submissions Quantitative Motion Analysis Project End of term exam
CLO 5	Identify the biomechanical loads experienced by specific anatomical structures during different postures and movements and recognise when this poses a risk of injury.	Laboratory submissions Quantitative Motion Analysis Project End of term exam

3. Strategies and approaches to learning

3.1 Learning and teaching activities

This course includes a series of online lectures conveying the application of quantitative movement analysis of exercise, activities of daily living, and work tasks. The online lectures deliver the theoretical information on which the laboratory activities are based. The laboratory classes will focus on quantitative movement analysis techniques and qualitative movement assessment skills. These learning activities will progressively build on the biomechanical knowledge and skills you acquired through completion of Biomechanics (HESC2451). With your aim as practitioners (clinicians) being to assist people with movement enhancement, the course also includes a series of online lectures outlining the theories associated with motor learning and skill acquisition. This content will build on the elementary introduction to motor control and learning that was provided in Introduction to Exercise Science (HESC1501). The online lectures also provide the theoretical basis for the labs in which you will develop and practice your skills in movement instruction. Assessment strategies throughout the course require you to apply your skills in movement assessment and instruction to real-life examples.

Assessment and instruction of movement tasks related to exercise, workplace tasks, and activities of daily living is a fundamental clinical skill required within the Exercise Physiology profession. Graduating students must therefore be proficient in assessing and instructing exercises and other movements. This course integrates concepts from functional anatomy, biomechanics, motor control and learning, and applies them to the assessment and instruction of movement. Students will develop the necessary skills for quantitative and qualitative assessment of human movement, and for teaching patients and clients appropriate and safe techniques for performance of exercises, work tasks or activities of daily living.

The learning and teaching philosophy underpinning this course is centred on student learning and aims to create an environment which interests and challenges students. The teaching is designed to be engaging and relevant in order to prepare students for future careers.

Online lectures

This approach is used to present relatively large amounts of information to students throughout the course. Online lectures will be available on Moodle throughout the term, and .pdf copies of the lecture slides will also be available on Moodle. Students are expected to complete each online lecture before the related lab class. The lectures provide the theoretical information that underpins all face-to-face classes and assessment tasks.

Laboratories

A minimum attendance of **80%** at laboratory classes is required to accreditation requirements unless Special Consideration has approved your absence (see below). The laboratory component of the course serves two purposes. Firstly, to help you to develop technical skills that will be relevant in your professional career. It is essential that you obtain some hands-on experience with the major clinical and/or research techniques in movement assessment and instruction before you begin your clinical practicum. These skills will be rehearsed and developed further during subsequent courses in the program. The second purpose is to demonstrate and reinforce key theoretical concepts that have been covered in the lectures. The questions contained in the laboratory documents will guide your learning in this respect.

Before participating in any laboratory classes, students must declare read the course's Risk Assessment (on Moodle). In the interests of safety, special attention should be paid to any precautionary measures recommended in the laboratory document. If any accidents or incidents occur they should be reported immediately to the tutor in charge of the class who will record the incident and recommend what further action is required.

OPTIONAL Tutorials

These optional sessions allow students to interact with course staff. The Week 1 tutorial will be a pre-recorded introduction to the course. Drop-in Q&A sessions will align with major assessment deadline weeks and are anticipated to last approximately 15 mins. In Weeks 2-5 and 7-10, students are encouraged to reach out to the convenors to book in a session (individual and group meetings are welcomed) for any additional support they may need related to assessments and/or course content.

Independent study

There is insufficient time in the laboratories for you to develop a deep understanding of the concepts covered in this course. In order for you to achieve the learning outcomes that will be assessed, you will need to revise the material presented in the course regularly. You will likely also need to do additional reading beyond the lecture materials in order to learn effectively.

Assessments

These tasks have been chosen as tools to enhance and guide your learning, and measure your progress, and are therefore a central teaching strategy in this course.

3.2 Expectations of students

Students are reminded that UNSW recommends that a 6 units-of-credit course should involve about 150 hours of study and learning activities. The formal learning activities total approximately 50 hours throughout the term and students are expected (and strongly recommended) to do at least the same number of hours of additional study.

Attendance at laboratory classes is mandatory unless Special Consideration has approved your absence (see below). Failing to meet the **80%** attendance requirement will mean the student's course progress cannot be considered complete, even if all assessment tasks are passed during the term.

3.3 Attendance requirements

"Students are expected to attend all scheduled clinical, laboratory and tutorial classes. An Unsatisfactory Fail (UF) may be recorded as the final grade for the course if students fail to meet the minimum requirement of 80% attendance for clinical, laboratory and tutorial classes (unless otherwise specified on Moodle). Course attendance expectations are determined by the requirements of the program accrediting body. Where a student is unable to attend, they are advised to inform the course convenor as soon as possible but no later than 3 days after the scheduled class and, where possible, provide written documentation (e.g. medical certificate) to support their absence."

4. Course schedule and structure

This course consists of 3 hours of class contact per week: 1 x 1 hr tutorial (online); 1 x 2hr lab (in class). You are expected to take an additional 5-6 hours of non-class contact hours to complete assessments, readings and exam preparation.

Week	Lecture	Laboratory TUESDAYS 2pm *See timetable for location*	Assessments Due	Related CLO
Week 0	L0: Assumed knowledge revision (optional)			
Week 1	L1: Measuring joint movement: Two-dimensional (2D) motion analysis L2: Measuring physical activity: Accelerometry	Lab 1: Processing and analysing 2D kinematic data		1,3
Week 2	L3: Qualitative analysis of human movement L4: Defining and measuring motor learning and performance	Lab 2: Collecting and analysing actigraphy data		2,4
Week 3	L5: Stages of motor learning, including kinematic and EMG descriptors L6: Instruction, demonstration, and observation in motor learning	Lab 3: Qualitative movement analysis	#2 Laboratory Submission (5%)	2-4
Week 4	L7: Feedback in motor learning: Definitions and functions of feedback L8: Feedback in motor learning: Effects of precision, timing and frequency of feedback	Lab 4: Instruction and demonstration in motor learning	#3 Laboratory Submission (5%)	4-5
Week 5	L9: Technique and safety assessment of resistance training L10: Measuring muscle activity: Electromyography	Lab 5: Feedback in motor learning	#4 Laboratory Submission (5%)	2-4
Week 6	**Flexibility week: no content**			

Week	Lecture	Laboratory TUESDAYS 2pm *See timetable for location*	Assessments Due	Related CLO
Week 7	L11: Measuring joint movement: Three-dimensional (3D) motion analysis - collecting data L12: Measuring joint movement: Three-dimensional (3D) motion analysis - analysing data	Lab 6: Quantitative Motion Analysis Project data collection	Quantitative Motion Analysis Project Proposal (10%)	4-5
Week 8	L13: Quantitative gait analysis L14: Biomechanical perspectives on injury	Lab 7: Quantitative Motion Analysis Project data processing	Movement Instruction Skills Assessment Part A: Video submission (7.5%)	1-3
Week 9	L15: Motor skill characteristics and constraints on motor performance L16: Motivation and attention in motor learning	Lab 8: Analysing 3D motion analysis data	Movement Instruction Skills Assessment Part A: Calibration phase (0%)	2,4
Week 10	L17: Memory and perception in motor learning L18: Practice and repetition in motor learning	Lab 9: Movement instruction practice & online gait analysis tutorial	Movement Instruction Skills Assessment Part A: Peer assessment (7.5%) Quantitative Motion Analysis Project Presentation Video (15%)	4-5
Exam period	L19: Course summary and review (optional)		Movement Instruction Skills Assessment Part B: Live Instruction Assessment (10%) Final Examination (35%)	1-5

Exam Period: 9 August – 22 August
Supplementary Exam Period: 2 September – 6 September

5. Assessment

5.1 Assessment tasks

Assessment tasks are listed in the table below. Assessment of your learning in the course will be achieved through laboratory submissions and reports, practical skills assessments, and a final examination. The laboratory submissions and quantitative motion analysis project will assess your ability to accurately collect, process, and analyse quantitative data, and to communicate concisely. The movement instruction practical skills assessment requirements are similar to those encountered when dealing with a client or patient in a face-to-face setting, or when communicating with other health professionals or researchers. These assessments will assess your ability to effectively communicate with and instruct clients or patients in performing specific movements and exercises. These assessments will require you to draw on theories of motor learning and skill acquisition presented in the lectures and laboratory classes. The final examination will assess your understanding of the principles underlying quantitative and qualitative analysis of human movement, theories on motor learning and movement instruction, and how these can be related to work-place ergonomics, therapeutic exercise, and activities of daily living.

Assessment task	Weight	Due date and time
Assessment 1: Laboratory Submissions	15% total 5% per week (Weeks 2, 3, 4)	Thursday of Weeks 3, 4 and 5, 16:00
Assessment 2: Quantitative Motion Analysis Project Part A: Proposal Part B: Presentation	25% total Part A: 10% Part B: 15%	Part A: Thursday of Week 7, 16:00 Part B: Thursday of Week 10, 16:00
Assessment 3: Movement Instruction Skills Assessment Part A: Movement Instruction Video & Peer Assessment Part B: Live Instruction Assessment	25% Part A: 15% Part B: 10%	Part A: Video submission: Thursday of Week 8, 17:00 Calibration phase: Thursday of Week 9, 17:00 Peer assessment: Monday of Week 10, 17:00 Part B: See exam schedule
Assessment 4: End of term exam	35%	2 hours after the opening of the exam

Further information

Please see guidelines below for the use of generative AI with each assessment task.

UNSW grading system: https://student.unsw.edu.au/grades

UNSW assessment policy: https://student.unsw.edu.au/assessment

5.2 Assessment criteria and standards

Detailed guidelines for each assessment are available on Moodle.

Assessment 1: Laboratory Submissions

This is an individual assessment. Laboratory work for Labs 2, 3, 4 will contribute to 15% of the course result, 5% per lab. Assessment items must be submitted by the due date stated on the individual document. Completed laboratory tasks relating to the following three lab sessions must be submitted:

- Laboratory 2: Collecting and Analysing Accelerometry Data (due Week 3)
- Laboratory 3: Instruction and Demonstration in Motor Learning (due Week 4)
- Laboratory 4: Processing and Analysing 2D Kinematic Data (due Week 5)

The formative feedback received for these tasks will assist with completion of the Quantitative Movement Analysis Project and Movement Instruction Skills Assessment.

AI Permission Level: SIMPLE EDITING ASSISTANCE

For this assessment task, you may use AI-based software to research and prepare prior to completing your assessment. You are permitted to use standard editing and referencing functions in word processing in the creation of your submission. You must not use any functions that generate or paraphrase passages of text, whether based on your own work or not.

Please note that your submission will be passed through an AI-generated text detection tool. If your marker has concerns that your answer contains passages of AI-generated text, you may be asked to explain your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

Assessment 2: Quantitative Motion Analysis Project

This is a group assessment task conducted in the form of a multi-stage movement analysis project. Students will use quantitative motion analysis to collect quantitative movement data. They will then process (calculate kinematic data using specialised motion analysis software), analyse and interpret the data to answer a specific research question. The project will be conducted in small groups, with each group working collaboratively to plan and conduct their quantitative motion analysis project. Students will be assessed on two separate components:

Part A) Proposal (10%): Each group will be required to submit a written project proposal including, i) summary of relevant background literature, ii) description of the aims and hypotheses of the proposed study, iii) description of data collection methodology iv) summary of variables that will be processed, analysed and interpreted. Project proposals may not exceed 750 words (including titles, in-text referencing, figure captions etc. and excluding bibliography and timeline).

Part B) Presentation (15%): Students will give a group oral presentation on their research project. This will include background, aims, methods, results and discussion (including limitations). Each group's presentation will be 12-15 minutes in duration. Presentations will be in the form of recorded narrated PowerPoint presentation. The video file will be submitted via Moodle.

AI Permission Level: DRAFTING ASSISTANCE

As this assessment task involves some planning or creative processes, you are permitted to use software to generate initial drafts. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the software should not be a part of your final submission. It is a good idea to keep copies of your initial drafts to show your lecturer if there is any uncertainty about the originality of your work.

Please note that your submission will be passed through an AI-text detection tool. If your marker has concerns that your answer contains passages of AI-generated text that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

Assessment 3: Movement Instruction Skills Assessment

This is an individual assessment comprising of two parts.

This practical assessment task will assess students' ability to perform movement instruction and qualitative analysis of commonly used exercises by Exercise Physiologists. This assessment requires completion of two parts:

Part A) Movement Instruction Video & Peer Assessment (15%):

Students will be required to submit a short video of themselves instructing one exercise to a friend/housemate/partner/family member etc. (7.5%). Students will then complete the calibration phase of the assessment, where they grade two example movement instruction videos. Following this, students will assess two peer video submissions (7.5%). Peer assessment will be randomly allocated and is compulsory in order to obtain a mark for Part A. Feedback provided from Part A should be used in preparation for Part B.

Part B) Live Movement Instruction and Qualitative Analysis (10%):

Students are required to conduct a movement instruction session with a mock patient. Mock patients will be allocated by the course convenors. Students will be required to instruct two exercises in real-time in a face-to-face setting on campus.

Students will be assessed on their use of physical demonstration, verbal instruction, feedback delivery, and motivational strategies. The primary objective of this assessment task is to provide students the opportunity to perform movement instruction and qualitative analysis, two tasks critical to Exercise Physiology professional practice.

AI Permission Level: NO ASSISTANCE – INVIGILATED ASSESSMENT

It is prohibited to use any software or service to search for or generate information or answers. If such use is detected, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion.

Assessment 4: End of term exam

This is an individual assessment. It will be held during the Final Examination Period, and will cover ALL material presented in lectures, laboratories, and assessment tasks from the whole term. The specific date, time and location of the Examination will be released by the UNSW Examinations Office.

AI Permission Level: SIMPLE EDITING ASSISTANCE

For this assessment task, you may use AI-based software to research and prepare prior to completing your assessment. You are permitted to use standard editing and referencing functions in word processing in the creation of your submission. You must not use any functions that generate or paraphrase passages of text, whether based on your own work or not.

Please note that your submission will be passed through an AI-generated text detection tool. If your marker has concerns that your answer contains passages of AI-generated text, you may be asked to explain your work. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

5.3 Submission of assessment tasks

Late Submission

UNSW has standard late submission penalties as outlined in the UNSW Assessment Implementation Procedure, with no permitted variation. All late assignments (unless extension or exemption previously agreed) will be penalised by 5% of the maximum mark per day (including Saturday, Sunday, and public holidays). For example, if an assessment task is worth 30 marks, then 1.5 marks will be lost per day (5% of 30) for each day it is late. So, if the grade earnt is 24/30 and the task is two days late the student receives a grade of 24 – 3 marks = 21 marks.

Late submission is capped at 5 days (120 hours). This means that a student cannot submit an assessment more than 5 days (120 hours) after the due date for that assessment.

Short Extension

No short extensions are available in this course.

Special Consideration

In cases where short term events beyond your control (exceptional circumstances) will affect your performance in a specific assessment task, you may formally apply for Special Consideration through myUNSW.

UNSW has a Fit to Sit rule, which means that by sitting an examination on the scheduled date, you are declaring that you are fit to do so and cannot later apply for Special Consideration. Examinations include centrally timetabled examinations and scheduled, timed examinations, tests and practical assessments managed by your School.

You must apply for Special Consideration **before** the start of your exam or due date for your assessment, except where your circumstances of illness or misadventure stop you from doing so.

If your circumstances stop you from applying before your exam or assessment due date, you must **apply within 3 working days** of the assessment, or the period covered by your supporting documentation.

More information can be found on the Special Consideration website.

5.4. Feedback on assessment

Solutions for Quizzes will be provided, and students are encouraged to review their own work against the solution set. Feedback for Laboratory Submissions and Quantitative Motion Analysis Project Proposals and Presentations will occur via a marking rubric (except the Laboratory 3 Submission, whereby students will be provided a grade that represents the closeness between an expert's evaluation and a student's evaluation of the same movement instruction task). Should students want to individually (Laboratory Submissions) or collectively (Quantitative Motion Analysis Project) discuss their submission/s, they can also book an appointment to speak with course staff.

Feedback for the Movement Instruction Skills Assessment Part A will be delivered both as an automated Moodle output and by a peer. No feedback will be available for the Movement Instruction Skills Assessment Part B and the Final Exam, other than a final course grade.

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Please use Vancouver or APA referencing style for this course.

Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

Academic integrity *is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits**:** honesty, trust, fairness, respect, responsibility and courage.*[1] *At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.*

Further information about academic integrity and ***plagiarism*** *can be located at:*

- *The Current Students site* https://student.unsw.edu.au/plagiarism*, and*
- *The ELISE training site* https://subjectguides.library.unsw.edu.au/elise

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct.

[1] International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

7. Readings and resources

Recommended Reference Books

Edwards, W.H. (2011). Motor Learning and Control: From Theory to Practice, Wadsworth Cengage Learning

- ISBN: 978-0-495-01080-7
- UNSW Library call no. 152.334/37

Griffiths, I.W. (2006). Principles of Biomechanics and Motion Analysis, Lippincott, Williams & Wilkins

- ISBN: 978-0-7817-5231-2
- UNSW Library call no. 612.76/187

Knudson, D.V. (2013). Qualitative Diagnosis of Human Movement, 3rd Edition, Human Kinetics

- ISBN: 978-0-7360-3462-3
- UNSW Library call no. 612.76/148

Suggested Reference Books

Schmidt, R.A. & Lee, T.D. (2008). Motor Learning and Performance, 5th Edition, Human Kinetics

- ISBN: 978-1-4504-4361-6
- UNSW Library call no. 152.334/24

Magill, R.A. (2011) Motor Learning and Control: Concepts and Applications 10th Edition, McGraw-Hill

- ISBN: 978-0-0780-2267-8
- UNSW Library call no. 152.334/22

McGinnis, P.M. (2013) Biomechanics of Sport and Exercise, 3rd Edition, Human Kinetics

- ISBN: 978-0-7360-7966-2
- UNSW Library call no. 612.76/173A

Hamill, J. & Knutzen, K.M. (2009). Biomechanical Basis of Human Movement, 3rd Edition, Lippincott, Williams & Wilkins

- ISBN: 978-0-7817-9128-1
- UNSW Library call no. 612.76/177

Suggested Reference Journals

Perceptual and Motor Skills

Motor Control

Journal of Motor Behaviour

Human Movement Science

Journal of Human Movement Studies

Journal of Applied Biomechanics

Sports Biomechanics

Gait and Posture

Journal of Biomechanics

Clinical Biomechanics

8. Administrative matters

Student enquiries should be submitted via student portal https://portal.insight.unsw.edu.au/web-forms/

9. Additional support for students

- The Current Students Gateway: https://student.unsw.edu.au/
- Academic Skills and Support: https://student.unsw.edu.au/academic-skills
- *Student Wellbeing and Health* https://www.student.unsw.edu.au/wellbeing
- UNSW IT Service Centre: https://www.myit.unsw.edu.au/services/students
- *UNSW Student Life Hub:* https://student.unsw.edu.au/hub#main-content
- *Student Support and Development:* https://student.unsw.edu.au/support
- *IT, eLearning and Apps:* https://student.unsw.edu.au/elearning
- *Student Support and Success Advisors:* https://student.unsw.edu.au/advisors
- *Equitable Learning Services (Formerly Disability Support Unit):* https://student.unsw.edu.au/els
- *Transitioning to Online Learning* https://www.covid19studyonline.unsw.edu.au/
- *Guide to Online Study* https://student.unsw.edu.au/online-study