HESC2452

Movement Assessment and Instruction

Course Outline

Term 2, 2023

School of Health Sciences

Faculty of Medicine & Health

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1. Staff

Position	Name	Email	Consultation times and locations
Course Convenor	Dr Rachel Ward Dr Paulo Silva Pelicioni	rachel.ward@unsw.edu.au paulo.silvapelicioni@unsw.edu.au	By appointment
Tutors	Jade O'Brien-Smith Key Nahan	j.obriensmith@unsw.edu.au k.nahan@unsw.edu.au	

2. Course information

Units of credit: 6

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

Teaching times and locations: see timetable Timetable HESC2452.unsw.edu.au

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 semester exam
CLO 2	Demonstrate an understanding of the implications of individual differences on motor learning and skill acquisition.	Movement Instruction Skills Assessment End of semester 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 semester 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 semester 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 – Attendance at laboratory classes is mandatory due 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.

Tutorials – These optional sessions allow students to interact with course staff. Students are encouraged to attend the Week 1 tutorial, which provides an overview of 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 attendance requirements will mean the student's course progress cannot be considered complete, even if all assessment tasks are passed during the term.

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 *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		4-5
Week 2	L3: Qualitative analysis of human movement L4: Defining and measuring motor learning and performance	Lab 2: Collecting and analysing actigraphy data	Lab 1 Submission (5%)	1-5
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	Lab 2 Submission (5%)	1-3
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		1-3
Week 5	L9: Technique and safety assessment of resistance training L10: Measuring muscle activity: Electromyography	Lab 5: Feedback in motor learning	Quantitative Motion Analysis Project Proposal (10%)	1-5
Week 6	Flexibility week: no content			
Week 7	L11: Measuring joint movement: Three-dimensional (3D) motion analysis - collecting data	Lab 6: Quantitative Motion Analysis Project data collection	Lab 4 Submission (5%)	4-5

	L12: Measuring joint movement: Three-dimensional (3D) motion analysis - analysing data			
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%)	4-5
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 (7.5%) Movement Instruction Skills Assessment Part A: Peer assessment	1-5
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	Quantitative Motion Analysis Project Presentation Video (15%)	1-5
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: 11 August – 24 August
Supplementary Exam Period: 4 September – 8 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 (Lab work): Laboratory Submissions	15% total 5% per week (Lab 1, 2, 4)	Friday of Weeks 2, 3 and 7. Before the start time of your usual Friday lab.
Assessment 2 (Project): Quantitative Motion Analysis Project Part A: Proposal Part B: Presentation	25% total Part A: 10% Part B: 15%	Part A: Thursday of Week 5, 17:00 Part B: Thursday of Week 10, 17:00
Assessment 3 (Performance): 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: Monday of Week 9, 17:00 Peer assessment: Thursday of Week 9, 17:00 Part B: During final exam period.
Assessment 4 (Examination): End of term exam	35%	During final exam period.

Further information

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.

Laboratory Submissions - This is an individual assessment. Laboratory work for Labs 1, 2 and 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 1: Processing and Analysing 2D Kinematic Data (due Week 2)
- Laboratory 2: Collecting and Analysing Accelerometry Data (due Week 3)
- Laboratory 4: Instruction and Demonstration in Motor Learning (due Week 7)

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

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.

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.

End of semester exam - This is an individual assessment. It will be held during the Final Examination Period, and will cover ALL material presented in lectures, tutorials, 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.

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.

Special Consideration

If you experience a short-term event beyond your control (exceptional circumstances) that impacts your performance in a particular assessment task, you can apply for Special Considerations.

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 4 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.

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

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

- 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