ANAT1451

Functional Anatomy & Biomechanics I

Course Outline

Term 2, 2023

School of Medical Sciences
Faculty of Medicine & Health

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1. Staff

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2. Course information

Units of credit: 6

Pre-requisite(s): Enrolment in program 3896 Exercise Science/Physiotherapy and Exercise Physiology OR 3897 Applied Exercise Science/Clinical Exercise Physiology

Teaching times and locations: please consult the course schedule below and the ANAT1451 online timetable available at https://timetable.unsw.edu.au/2023/ANAT1451.html

2.1 Course summary

Are you preparing to be a movement specialist, or seeking a deeper understanding of the upper and lower limb function and dysfunction? Immerse yourself in understanding functional anatomy of limb movement underpinned by foundational principles of biomechanics. In this course you will acquire a deep understanding of the neuromuscular anatomy of the limbs and their role in facilitating movement by integrating functional biomechanics. You will apply this knowledge to understand how movement may be compromised in musculoskeletal and nerve injury. Hands-on laboratory-based study involving human donor cadavers, medical imaging and surface anatomy will be complemented by adaptive online learning modules and case-based tutorials to understand normal function, clinical presentation and functional deficits.

2.2 Course aims

This course aims to provide you with a comprehensive knowledge of the functional anatomy of the upper and lower limbs underpinned by biomechanical principles. You will apply your knowledge of limb anatomy to interpret medical imaging and clinical presentations, and to predict the functional deficits of neuromusculoskeletal lesions.

2.3 Course learning outcomes (CLO)

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

1. demonstrate ethical principles of working with diverse groups of people and with human tissue,
2. apply anatomical terms to describe position, movement, body direction, regions, body planes or sections,
3. describe the musculoskeletal anatomy including origin, insertions, bony landmarks, joint structure and neurovascular supply of the upper and lower limbs,
4. apply anatomical knowledge to explain joint movement,
5. correlate functional anatomy with surface anatomy, medical imaging, clinical presentation and fundamental biomechanical principles,

6. describe the impact of body proportions and anatomical differences on movement,
7. explain how kinematics and kinetics can be used to understand human-environment and human-equipment interactions in relation to activities of daily living and human movement,
8. describe results from static and dynamic physical assessments and provide recommendations for movement or exercise modification.

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	LO Statement	Related Tasks & Assessment
CLO 1	Demonstrate ethical principles of working with diverse groups of people and with human tissue	Tutorial work Integrated Practical Assessment
CLO 2	Apply anatomical terms to describe position, movement, body direction, regions, body planes or sections	Continuous Assessment Integrated Practical Assessment Exam
CLO 3	Describe the musculoskeletal anatomy including origin, insertions, bony landmarks, joint structure and neurovascular supply of the upper and lower limbs	Continuous Assessment Tutorial work Integrated Practical Assessment Exam
CLO 4	Apply anatomical knowledge to explain joint movement	Continuous Assessment Tutorial work Integrated Practical Assessment Exam
CLO5	Correlate functional anatomy with surface anatomy, medical imaging, clinical presentation and fundamental biomechanical principles	Continuous Assessment Tutorial work Integrated Practical Assessment Exam
CLO6	Describe the impact of body proportions and anatomical differences on movement	Continuous Assessment Tutorial work Integrated Practical Assessment Exam
CLO7	Explain how kinematics and kinetics can be used to understand human-environment and human-equipment interactions in relation to activities of daily living and human movement	Continuous Assessment Tutorial work Integrated Practical Assessment Exam
CLO8	Describe results from static and dynamic physical assessments and provide recommendations for movement or exercise modification	Continuous Assessment Tutorial work Integrated Practical Assessment Exam

3. Strategies and approaches to learning

3.1 Learning and teaching activities

This course uses a blended learning framework and is underpinned by active learning principles. Face to face seminars and laboratory sessions integrate with self-directed interactive online videos and tutorials. Student learning in each topic culminates in an online quiz and a problem-based tutorial that incorporates collaborative learning and application of the concepts to clinical presentation and practice. Seminars will provide you with the framework for inquiry and learning in each topic. These sessions are interactive and provide an overview of the topic, highlighting important correlations of functional anatomy and biomechanics with clinical presentation and practice.

Interactive videos and tutorials are available for self-guided work during the entire course and provide students with an opportunity to master challenging concepts in each topic. The videos are supported by transcripts and embedded formative quizzes. The online tutorials incorporate video explanations, quiz-style questions, and cadaveric and medical imaging. Feedback is provided immediately and is response-specific.

Laboratory practical sessions provide students with a collaborative hands-on exploration of human donor prosections, medical imaging and surface anatomy related to each topic. This is a privileged experience of exploration, discovery and discussion facilitated by skilled tutors and near-peer demonstrators.

Problem-based tutorial sessions are face-to-face collaborative learning experiences designed for you to clarify and apply the knowledge and concepts gained in each topic to clinical and functional case studies, movement analysis and medical imaging.

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.

It is expected that for every timetabled hour of learning activity, you will need at least an hour of additional self-directed study. To assist your self-directed study, online learning modules are available in each topic. To master the course content, it is expected that you will engage with these for at least one additional hour per week.

It is expected that you will attend all face-to-face lectures, practical, and tutorial sessions. Each of these sessions are interactive and active participation is recommended. Laboratory and tutorial sessions, as well as the group assignment are collaborative learning experiences and is framed on being accountable for your learning and that of your peers. For some of these sessions, pre-work is required. This expectation will be clearly outlined in the course learning management system.

4. Course schedule and structure

WEEK	START	LECTURES Pre-recorded: available on Moodle	LAB 1 MONDAYS 10-12 OR 12-2PM Anatomy Lab 7 Level 1 Biological Sciences	LAB 2 WEDNESDAYS 9-11AM OR 11-1PM Anatomy Lab 7 Level 1 Biological Sciences	TUTORIAL WEDNESDAYS OR THURSDAYS 9-11AM OR 11-1PM OR 1-3PM Physiotherapy Clinical Skills Room	SELF-DIRECTED ONLINE ACTIVITY	Related CLO
1	29-May	Pectoral Girdle & Shoulder	**1:** Bones, joints & ligaments of pectoral girdle & shoulder	**2:** Muscles & blood vessels of pectoral girdle & shoulder	Case-based tutorial 1	**Practice Quiz VAnAT**	1-8
2	5-Jun	Brachial Plexus & Arm	**3:** Bones, joints, ligaments & muscles of the arm	**4:** Blood vessels of the arm & brachial plexus	Case-based tutorial 2	**Practice Quiz VAnAT**	1-8
3	12-Jun	Elbow & Forearm	**Public Holiday**	**5:** Structures of the elbow & forearm	Case-based tutorial 3	**Practice Quiz VAnAT**	1-8
4	19-Jun	Wrist & Hand	**6:** Bones, joints & ligaments of the wrist & hand	**7:** Muscles, blood vessels & nerves of the wrist & hand	Case-based tutorial 4	**Practice Quiz VAnAT**	1-8
5	26-Jun		**8:** Revision	**9: INTEGRATED PRACTICAL ASSESSMENT 1**	Case-based tutorial 5	**Practice Integrated Practical Assessment 1**	1-8
6	3-Jul	**FLEXIBILITY WEEK**					
7	10-Jul	Pelvis & Gluteal Region	**10:** Bones, joints & ligaments of the pelvis & gluteal region	**11:** Muscles, blood vessels & nerves of the pelvis & gluteal region	Case-based tutorial 6	**Practice Quiz VanAT**	1-8
8	17-Jul	Thigh & Knee	**12:** Bones, joints & ligaments of the thigh & knee	**13:** Muscles, blood vessels & nerves of the thigh & knee	Case-based tutorial 7	**Practice Quiz VanAT**	1-8
9	24-Jul	Leg, Ankle & Foot	**14:** Bones, joints & ligaments of the leg, ankle & foot	**15:** Muscles, blood vessels & nerves of the leg, ankle & foot	Case-based tutorial 8	**Practice Quiz VanAT**	1-8
10	31-Jul		**16:** Revision	**17: INTEGRATED PRACTICAL ASSESSMENT 2**	Case-based tutorial 9	**Practice Integrated Practical Assessment 2**	1-8
Exam Period		**EXAM**					

Exam Period: 11 Aug – 24 Aug 2023
Supplementary Exam Period: 4 Sep – 8 Sep 2023

5. Assessment

5.1 Assessment tasks

Assessment task	Weight	Due date and time
Continuous Assessment	20%	Weekly Monday at 5pm
Tutorial Work	20%	Weekly in Tutorial
Integrated Practical Assessment	30%	Week 5 and 10 in Wednesday Lab
Exam	30%	During exam period

Continuous Assessment
This assessment task comprises weekly quizzes that cumulatively are worth 20% of the course mark. This is a continuous assessment quiz released at end of each week (9 quizzes in total, the five highest quiz marks contribute to this assessment mark). Students will have one attempt at each quiz. No resits or supplementary continuous assessments will be provided.

The continuous assessment quizzes test practical and theoretical knowledge acquired in the course and the application of this knowledge. The aim of this assessment is to ensure you attain an understanding of the concepts in each topic and to identify any concepts for immediate remediation. Individualised feedback is provided at the end of the assessment time. Cohort feedback is provided at the next session led by an academic facilitator where misconceptions will be discussed.

Tutorial Work
This assessment task is worth 20% of the overall course mark. It has two components:

- **Pre-tutorial online activities:** These comprise weekly tasks that cumulatively are worth 10% of the overall course mark. Pre-tutorial online activities help you develop clinical reasoning skills by assessing your ability to apply functional anatomy and biomechanics concepts to case scenarios. Feedback is provided immediately via the course learning management system.
- **In-class tutorial activities:** These comprise weekly tasks that cumulatively are worth 10% of the overall course mark. In-class tutorial activities assess your ability to palpate bony and soft tissue landmarks on the surface of the body and apply knowledge of functional anatomy and biomechanics in assessing joint range of motion. Feedback is provided immediately in class during tutorial throughout the term.

Integrated Practical Assessment
This is an integrated practical assessment that occurs at mid- and end- of term. Each assessment is 1 hour 15 minutes long, and contributes to half of the weighting of this assessment item. It is based on the laboratory and tutorial practical concepts in the preceding weeks.

Individualised feedback is provided at the end of the assessment. Cohort feedback is provided at the next session led by an academic facilitator.

Exam
This is a final written examination that takes place during the examination period. It is worth 30% of the overall course mark. The task assesses the integration of theoretical and practical components of the course. It is designed to assess deeper learning and critical thinking by requiring students to apply concepts studied in the course to solve problems. Cohort feedback is provided once the exams are completed in the form of a post in the course learning management system.

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

Assessment	Level of Attainment			
	Developing	Functional	Proficient	Advanced
Assessment 1: Continuous Assessment	Limited understanding of required knowledge and concepts. Inaccurate understanding and explanation of concepts discussed during the week's activities	Can reproduce accurately required facts and definitions. Has adequate breadth, but limited depth of understanding of concepts as evidenced in application of content to case scenarios	Exhibits breadth and depth of understanding of concepts in the knowledge domain.	Exhibits accurate and elaborated breadth and depth of understanding of concepts in the knowledge domain. Can apply concepts well to clinical scenarios.
Assessment 2: Tutorial Work	Inaccurate understanding and explanation of concepts; Cannot explain concepts in own words.	Has adequate breadth, but limited depth of understanding of concepts as evidenced in application to case scenarios	Exhibits breadth and depth of understanding of concepts in the knowledge domain. Can use terminology accurately in new contexts and can discuss concepts appropriately in own words. Demonstrates an appreciation of the limits of their own understanding	Exhibits accurate and elaborated breadth and depth of understanding of concepts in the knowledge domain. Can apply concepts well to clinical scenarios. Can justify application of concepts based on anatomical and biomechanical principles
Assessment 3: Integrated Practical Assessment	Limited understanding of required knowledge of practical concepts. Inaccurate understanding and explanation of concepts discussed in lectures and laboratory sessions; Cannot explain concepts in own words.	Can reproduce accurately required facts and definitions. Has adequate breadth, but limited depth of understanding of practical concepts.	Exhibits breadth and depth of understanding of practical concepts. Can use terminology accurately in new contexts and can discuss concepts appropriately in own words. Demonstrates an appreciation of the limits of their own understanding	Exhibits accurate and elaborated breadth and depth of understanding of concepts in the knowledge domain. Can apply concepts well to clinical scenarios. Can justify application of concepts based on anatomical and functional principles
Assessment 4: Exam	Limited understanding of required knowledge and concepts. Inaccurate understanding and explanation of concepts discussed in lectures and laboratory sessions; Cannot explain concepts in own words.	Can reproduce accurately required facts and definitions. Has adequate breadth, but limited depth of understanding of concepts as evidenced in application to clinical problems.	Exhibits breadth and depth of understanding of concepts in the knowledge domain. Can use terminology accurately in new contexts and can discuss concepts appropriately in own words. Demonstrates an appreciation of the limits of their own understanding	Exhibits accurate and elaborated breadth and depth of understanding of concepts in the knowledge domain. Can apply concepts well to clinical scenarios. Can justify application of concepts based on anatomical and functional principles

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

This is a challenging course. Feedback on learning is a regular feature of the course. During laboratory and tutorial sessions feedback is provided by peers and academic facilitators regularly as you complete various activities individually and collaboratively.

Assessment 1: Continuous Assessment - Individualised feedback is provided at the end of the assessment time. Cohort feedback is provided at the next session led by an academic facilitator and misconceptions discussed. You will be able to access online activities to remediate any misconceptions or troublesome concepts.

Assessment 2: Tutorial Work – Individualised feedback on the weekly pre-tutorial online modules is provided immediately via the course learning management system. Feedback on the weekly in-class tutorial activities is provided immediately during tutorial throughout the term.

Assessment 3: Integrated Practical Assessment - Individualised feedback is provided at the end of the assessment. Cohort feedback is provided at the next session led by an academic facilitator.

Assessment 4: Exam - Cohort feedback is provided once the exams are completed in the form of a post in the course learning management system.

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

In addition to the **lab manual**, you will need a textbook **AND** an atlas of human anatomy for this course.

Recommended text

1. Soames R., & Palastanga N. (2019) **Anatomy and Human Movement**. (7th ed.). Elsevier.

(Available online through the library or via the course Moodle site)

Recommended Atlas

2. Tank P.W. and Gest T.R. (2009) **Atlas of Anatomy**. Lippincott, Wilkins and Williams

(note: This comes as a bundle with Clinically Oriented Anatomy from the UNSW bookshop)

OR

Abrahams, PH, Spratt, JD, Loukas M, and van Schoor A-N (2013) **McMinns & Abrahams' Clinical Atlas of Human Anatomy** . Elsevier Health

Other useful textbooks are:

3. Moore K.L., & Agur A. M. R., Dalley A.F. (2013) **Clinically Oriented Anatomy**. (7th ed.). Lippincott Williams & Wilkins: Baltimore
4. Drake, R.L., Vogl, W., Mitchell, A.W.M. & Gray, H. (2015). **Gray's Anatomy for Students**. (3rd ed.). Philadelphia; London: Elsevier/Churchill Livingstone.
5. Hamill, J. & Knutzen, K.M.(2009). **Biomechanical Basis of Human Movement,** 3rd Edition, Lippincott, Williams & Wilkins. ISBN: 0781734053 *(Library call no. 612.76/177)*

Online resources

6. Virtual Anatomy Tutorials – accessed via the learning management system
7. Anatomy videos – accessed via UNSW Box
8. Acland's anatomy videos – accessed via the university library
9. Arnold's Glossary of Anatomical Terms
10. Complete Anatomy – accessed via the university library

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

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

10. Student risk assessments

Medicine and Science Teaching Laboratory **Student Risk Assessment**	UNSW SYDNEY	Anatomy Practical Classes for Medical and Science Students D26 Ian Jacobs Building L1 LAB08A/07

Hazards	Risks	Controls
Chemical Formaldehyde Methylated spirits 2-phenoxyethanol	Corrosive Flammable Irritant	• Low concentrations of chemicals used • Adequate air changes and ventilation provided • Safety Data Sheets for chemicals available
Physical Cold temperature Heavy and sharp models (e.g. bone/plastic)	Cold Penetrating wound or foot injury	• Always wear a laboratory coat • Wear enclosed shoes with full coverage of dorsum of foot • Wear protective eyewear
Biological Fungi Bacteria (tetanus) Hepatitis B and C	Infection	• Ensure appropriate immunisation is current • Wear a face mask (if required) • Wear disposable gloves when handling wet specimens and do not cross-contaminate models or bones with wet specimens • Do not bring in any food or drinks • Do not place anything into your mouth (e.g. pen) • Use disinfectant provided for cleaning models and surfaces • Use hand sanitisers provided regularly • Wash hands with soap and dry thoroughly before leaving

Personal Protective Equipment (required)

Emergency Procedures

In the event of an alarm, follow the instructions of the academic in charge. The initial sound (beep) is advising you to prepare for evacuation. During this time pack up your personal belongings. The second sound (whoop) gives instruction to leave. The assembly point is on the lawn in front of the Chancellery. In the event of an injury inform the academic in charge (and/or lab staff). First aider and fire warden contact details are on display by the lifts on the floor and in each room. There are portable First Aid Kits located in LAB08A and LAB07.

Clean up and waste disposal

- Cover wet specimens with the towels provided. Make sure that towels do not hang over the edge of the table as this may result in fluid dripping onto the floor. Fluids on the floor are a major safety hazard and should be reported to lab staff immediately.
- Replace stools under the tables (if applicable).
- Remove your gloves and dispose in the biowaste bins provided.
- Wash your hands thoroughly with soap and dry with paper towels provided.
- Remove your laboratory coat as you leave the room.

Ethics Approval

This type of practical has been previously considered and approved by the UNSW Human Research Ethics Advisory Panel (HC180115).

Declaration

I have read and understand the safety requirements for this practical class, and I will observe these requirements.

Signature:…… **Date**:……
Student number: .....

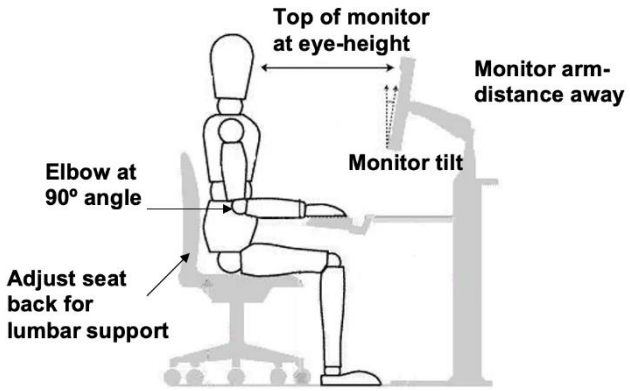
ANAT-SRA-Med&SciStudent relates to RA-MED-06. Date for review: 01/02/2024

Medicine and Science Teaching Laboratory **Student Risk Assessment**	UNSW SYDNEY	Practical Classes (Dry & Computer Labs) for Medicine and Science Students C27 Wallace Wurth Building G06/07 D26 Ian Jacobs Building L1 LAB08B

Hazards

Ergonomics	Musculoskeletal pain	• Correct workstation set-up • Check electrical equipment is in good condition before use • All portable electrical equipment tested and tagged • Disinfectants and wipes available for use before and after the practical
Electrical	Electrical shock/Fire	
Biological	Infection	

Workstation set-up



Personal Protective Equipment

Face masks may be required. Please follow the instructions provided at the time of entry.

Emergency Procedures

In the event of an alarm, follow the instructions of the academic in charge. The initial sound (beep) is advising you to prepare for evacuation. During this time pack up your personal belongings. The second sound (whoop) gives instruction to leave. The assembly point is on the lawn in front of the Chancellery. In the event of an injury inform the academic in charge (and/or lab staff). First aider and fire warden contact details are on display by the lifts on the floor and in each room. There is a wall mounted First Aid Kit located at the end of the G06 or a portable kit in the 08A Laboratory.

Clean up and waste disposal

No apparatus or chemicals used in these rooms.

I have read and understand the safety requirements for this practical class, and I will observe these requirements.

Signature:…… Date:……

Student number: .....

ANAT-SRA-Med&SciStudent relates to RA-MED-06. Date for review: 01/02/2024