

HDAT9000

CLINICAL AI

Course Outline
Term 2, 2024

School of Medical Sciences
Faculty of Medicine & Health

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1. Staff

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor/ Lecturer/ Tutor	Associate Professor Blanca Gallego Luxan	b.gallego@unsw.edu.au	Wednesday afternoon after tutorial session –or via TEAMS	b.gallego@unsw.edu.au
Guest Lecturers/ Tutors	TBA			

2. Course information

Units of credit: 6

Pre-requisite(s): N/A

Teaching times and locations:

Wed morning session for ALL: 11am - 12pm, location: Online via TEAMS

Wed afternoon session for ONLINE only: 1pm - 2pm, location: Online via TEAMS

Wed afternoon session for IN PERSON only: 3pm - 4pm, location: K-F23-106 - Mat 106

<http://www.timetable.unsw.edu.au>

2.1 Course summary

This course is designed to equip you with the skills you need in order to contribute to the use of AI technologies in healthcare, with a focus on the use of AI for clinical tasks. The course starts by looking into the fundamentals of AI. In this phase of the course you will learn about what is artificial intelligence, the main approaches to build intelligent machines, how machines learn from data and what is the basic concept underpinning the success of deep learning algorithms. The course then looks into the lifecycle of clinical AI technologies. In this part you will gain insights into the fundamental concepts and best practices that drive the creation, assessment, and implementation of clinical AI tools. The course then concludes by looking into real-world examples of AI technology in clinical care. In this phase of the course you will learn about the challenges, and opportunities of AI tools that aim to automate and/or augment basic clinical care tasks, namely: diagnosis, prognosis, risk assessment, and treatment decisions. The course content will be delivered by a series of staged short lectures intercalated with problem-based learning tutorials, designed to consolidate what you learnt in the lectures and to actively engage you in the learning process.

This course is offered as multimodal delivery (online lectures, face-to-face tutorials) or fully online.

2.2 Course aims

This course aims to provide you with the knowledge and tools needed to drive, critically appraise and implement AI solutions in medicine, with a focus on technologies used in clinical practice.

2.3 Course learning outcomes (CLO)

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

1. Critically appraise AI terminology, concepts, and workflows
2. Analyse and identify appropriate opportunities for the use of AI in clinical practice

3. Identify and apply best practices for the assessment and evaluation of AI solutions in healthcare
4. Articulate and discuss socio-technical and ethical arguments surrounding the use of AI in medicine

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	LO Statement	Related Tasks & Assessment
CLO 1	Critically appraise AI terminology, concepts, and workflows	Lectures & Tutorials (w1-w9) Tutorial Quizzes (1,4)
CLO 2	Analyse and identify appropriate opportunities for the use of AI in clinical practice	Lectures & Tutorials (w7-w9) Research assignment
CLO 3	Identify and apply best practices for the assessment and evaluation of AI solutions in healthcare	Lectures & Tutorials (w2-w3) Tutorial Quizzes (2,3) Research assignment
CLO 4	Articulate and discuss socio-technical and ethical arguments surrounding the use of AI in medicine	Lectures & Tutorials (w4-w5) Research assignment

3. Strategies and approaches to learning

3.1 Learning and teaching activities

Each week students receive two teaching sessions consisting of focussed staged lectures, tutorials, and discussion sessions.

Focussed staged lectures: Designed to provide knowledge on a few fundamental concepts at a time. This is an online session. All students are expected to attend online synchronously so they can participate. However, these lectures will be recorded or pre-recorded.

Tutorials: Designed to help students internalise and reflect on the contents of the course using as exemplars real-world clinical AI applications. Students enrolled as multimodal delivery are expected to attend face-to-face. These sessions will not be recorded.

Discussion sessions: Designed to provide students with the opportunity to ask further questions regarding the course or their assignments (including their final assignment, which is a research task), as well as questions regarding their research dissertation projects. These sessions are optional and offered face-to-face only at the end of the tutorial session.

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. Students are expected to:

- Attend lectures and tutorial sessions.
- Complete and submit their assignments on time including: Tutorial quizzes and a research assignment.

4. Course schedule and structure

This course consists of 21 hours of class contact hours (3 hours per week over 10 weeks excluding week 6 – study week). You are expected to take an additional 3 hours per week of non-class contact hours to complete assessments, readings and prepare the final assignment.

Week	Topic	Activity	Related CLO
Week 1	Fundamentals: Fundamentals of AI	Focussed lectures Tutorial Tutorial Quiz 1 provided Discussion session	CLO 1
Week 2	Does it work? Algorithm Performance	Focussed lectures Tutorial Tutorial Quiz 2 provided Discussion session	CLO 1 CLO 3
Week 3	Is it desirable? Clinical Utility and Impact	Focussed lectures Tutorial Tutorial Quiz 3 provided Discussion session	CLO 1 CLO 3
Week 4	Is it desirable? Human Factors, Ethics and Biases	Focussed lectures Tutorial Tutorial Quiz 4 provided Discussion session	CLO1 CLO 4
Week 5	Is it desirable? Business models and innovation	Focussed lectures Tutorial Discussion session Final assignment description provided	CLO 1 CLO 4
Week 7	Examples: AI for diagnosis	Focussed lectures Tutorial Discussion session	CLO 1 CLO 2
Week 8	Examples: AI for risk assessment and prognosis	Focussed lectures Tutorial Discussion session	CLO 1 CLO 2
Week 9	Examples: AI for treatment recommendation	Focussed lectures Tutorial Discussion session	CLO 2 CLO 4
Week 10	Student presentations	Presentation of research task Q&A session	CLO 2 CLO 3 CLO 4

Week 12 - Final written research task due

5. Assessment

5.1 Assessment tasks

	Assessment type	Frequency	Approximate Length/Intensity	Marking weight	Issue date	Due date	Feedback date
1	Tutorial Quiz	Four times	~ 1 hour (intense)	10% each	Weeks 1,2,3,4	Weeks 3,4,5,7	The following week
3	Final Assignment (Research Task)	Proposal	~ 3 hours (light)	10%	Week 5	Week 7	Week 8
		Oral presentation (assumes high level completion of research task)	~ 3 hours (medium)	20%		Week 10	Week 10/11
		Final report	~ 5 hours (medium)	30%		Week 12	Week 13

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

Quiz: Assessment criteria based on number of correct answers.

Tutorial assessment: Assessment based on number of correct answers.

Research task presentation rubric:

Points	10	8	6	4	2
Relevance	Presentation content is very relevant and informative	Presentation content is mostly relevant and informative	Presentation content is somehow relevant and informative	Presentation content lacks significant relevance	Presentation content is neither relevant nor informative
Accuracy	Presentation content is always accurate	Presentation content is mostly accurate	Presentation content contains some inaccuracies	Presentation content contains significant inaccuracies	Presentation content contains highly significant inaccuracies
Completeness	Presentation is very comprehensive	Presentation is mostly comprehensive	Presentation is missing some information	Presentation is missing some significant information and is incomplete	Presentation is missing highly significant information and is clearly incomplete
Clarity	Presented very clearly	Presented clearly	Presentation is somewhat clear but contains some confusing elements	Presentation is not clear	Presentation lacks significant clarity and it is very difficult to follow
Visual presentation	Presentation is visually very appealing and with great use of visual aids	Presentation is visually appealing and makes use of visual aids	Presentation is visually appealing and informative	Presentation is not visually appealing and informative	Presentation is not visually appealing and lacks visual aids

Oral presentation	Presentation is very engaging and very well articulated	Presentation is engaging and well articulated	Presentation is somewhat engaging	Presentation is not engaging but can be understood	Presentation is not understandable
Answering questions	Presenter answered all questions clearly and comfortably	Presenter answered most questions clearly and comfortably	Presenter answered some (but not all) questions clearly and comfortably	Presenter was not able to answer important questions	Presenter was not able to answer any questions

Research task report rubric:

Points	10	8	6	4	2
Relevance	Document content is very relevant and informative	Document content is mostly relevant and informative	Document content is somehow relevant and informative	Document content lacks significant relevance	Document content is neither relevant nor informative
Accuracy	Document content is always accurate	Document content is mostly accurate	Document content contains some inaccuracies	Document content contains significant inaccuracies	Document content contains highly significant inaccuracies
Completeness	Document is very comprehensive	Document is mostly comprehensive	Document is missing some information	Document is missing some significant information and is incomplete	Document is missing highly significant information and is clearly incomplete
Organisation	Document is very well organised and content is very clear	Document is well organised and content is clear	Document is somewhat organised but contains confusing elements	Document is not well organised	Document is very poorly organised and it is very difficult to follow
Written presentation	Document is very well written and very appealing and with great use of tables and figures	Document is well written and with good use of tables and figures	Document is somewhat well written but could be clearly improved	Document is in need of better writing and use of tables and figures	Document is not well written, and does not make proper use of tables and figures
References	Document always refers to appropriate references	Document refers to appropriate references most of the time	Document refers to appropriate references sometimes	Document lacks significant references	Document does not make use of any appropriate references

5.3 Submission of assessment tasks

Tasks are to be submitted online by the due date/time.

Late Submission

Following UNSW policy, late submissions will be penalised at 5% per day, capped at five days from the assessment submission deadline. After five days a student cannot submit the 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. In this case, *the late penalty described above applies from the date of approved time extension.*

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

Feedback and marks on the tutorial quizzes will be provided the week following the due date.

Feedback on the proposal for the research task will be provided the week following the due date.

Feedback and marks on the oral presentations will be provided the week following the due date.

Feedback (without marks) on the research task report will be provided the week following the due date. Final marks will be provided on the date established by UNSW policy.

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.

Further information about referencing styles can be found at:

<https://student.unsw.edu.au/referencing>

Use of AI: Use of AI tools, such as ChatGPT to aid in your tutorial quizzes is allowed. Use of AI tools, such as ChatGPT to aid in your final assignment is allowed but under strict conditions. Your work must be substantially your own and simply copy-pasting information from ChatGPT is not allowed. Any use of ChatGPT in your final assignment must be reported, including details of how it was used.

Further information about the use of AI can be found at:

<https://www.student.unsw.edu.au/assessment/ai>

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:

- <https://www.teaching.unsw.edu.au/academic-integrity>, and
- *The Current Students site* <https://student.unsw.edu.au/plagiarism>

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

The following books are recommended for students who wish to have a more in depth understanding of the material covered in this course. They are not, however, to be thought of as textbooks and not required to successfully complete this course.

On the topic of concepts, theory, and history of Artificial Intelligence:

<https://unswbookshop.vitalsource.com/products/-v9781292410074>

On the topic of applications of Artificial Intelligence in Medicine and Healthcare:

<https://unswbookshop.vitalsource.com/products/-v9780128233382>

On the topic of Statistics and Data Science

<https://www.statlearning.com/>

Availability of these resources via UNSW can be found in the course website.

8. Administrative matters

Students can get help and support via the Nucleus Student Hub: <https://nucleus.unsw.edu.au/en/contact-us>

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>