UNSW Course Outline

HDAT9200 Statistical Foundations for Health Data Science - 2024

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General Course Information

Course Code : HDAT9200
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Medicine and Health
Academic Unit : School of Biomedical Sciences
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate, Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Health data is often complex and noisy. Obtaining actionable insights (or revealing the hidden signals) from such data requires the utilisation of probabilistic concepts. Thus a solid understanding of the principles of statistics is intrinsic to Health Data Science. The aim of this

course to introduce the foundations required to understand such phenomena.

Course Aims

The aim of this course is to equip you with a sound understanding of statistical principles underpinning Health Data Science. This will be achieved by innovatively employing statistical computing skills to arrive at the desired learning outcomes.

Relationship to Other Courses

Assistance with progression checking:

If you are unsure how this course fits within your program, you can seek guidance on optimising your program structure, from staff at the Nucleus Student Hub.

- Progression plans for UNSW Medicine and Health programs can be found on the UNSW Medicine & Health website.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Critique the Frequentist and Bayesian frameworks of probability.
CLO2 : Appraise probability distributions and their summaries.
CLO3 : Evaluate the role of Causation, Bias, and Confounding in Epidemiology.
CLO4 : Investigate epidemiological risks and rates.

Course Learning Outcomes	Assessment Item
CLO1 : Critique the Frequentist and Bayesian frameworks of probability.	• Phase III - Practical exercises • Phase IV: MCQ XP • Final Course Phase IV Reflection
CLO2 : Appraise probability distributions and their summaries.	• Phase III - Practical exercises • Phase IV: MCQ XP • Final Course Phase IV Reflection
CLO3 : Evaluate the role of Causation, Bias, and Confounding in Epidemiology.	• Phase III - Practical exercises • Phase IV: MCQ XP • Final Course Phase IV Reflection
CLO4 : Investigate epidemiological risks and rates.	• Phase III - Practical exercises • Phase IV: MCQ XP • Final Course Phase IV Reflection

Learning and Teaching Technologies

Microsoft Teams | Open Learning

Learning and Teaching in this course

All course materials (or open access links thereto) are provided on the course learning management systems, Microsoft Teams or Openlearning. All course announcements are posted to Microsoft Teams or Openlearning. Instructions on how to access Openlearning will be posted on the HDAT9200 Teams space during O-Week.

By accessing and using the ICT resources provided by UNSW, you are agreeing to abide by the 'Acceptable Use of UNSW ICT Resources' policy particularly on respect for intellectual property and copyright, legal and ethical use of ICT resources and security and privacy.

Additional Course Information

The Health Data Analytics (HDAT) courses are part of the Health Data Science Program taught by The Centre for Big Data Research in Health (CBDRH).

A selection of the Health Data Analytics (HDAT) courses are also incorporated into the Clinical Artificial Intelligence Pathway.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Phase III - Practical exercises Assessment Format: Individual Short Extension: Yes (2 days)	27%	Start Date: Not Applicable Due Date: Weekly
Phase IV: MCQ XP Assessment Format: Individual	18%	Start Date: Not Applicable Due Date: Weekly
Final Course Phase IV Reflection Assessment Format: Individual Short Extension: Yes (2 days)	55%	Start Date: Not Applicable Due Date: See Teams for date and time (Week 11)

Assessment Details

Phase III - Practical exercises

Assessment Overview

Each chapter of the course is structured into four phases. Having completed Phase 1 (Explore)

and Phase 2 (Connect), you will be expected to attempt a small number (typically 3-4) of practical exercises in Phase 3 (Solve). These typically include a mixture of skills including problem solving, coding, and interpretation.

You will receive a score and individual feedback within 10 working days of submission. Outline solutions will also be provided

Course Learning Outcomes

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- CLO4 : Investigate epidemiological risks and rates.

Detailed Assessment Description

Detailed instructions regarding this assessment will be provided on the course Microsoft Teams site.

Submission notes

Short extension & Special consideration. These exercises have a short extension option.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. 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 tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.
If your Convenor has concerns that your answer contains passages of AI-generated text or media 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 and media 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.
For more information on Generative AI and permitted use please see here.

R coding assistance may be sought, for example from Google Colab and/

or Microsoft Copilot with Commercial Data Protection enterprise edition.

Phase IV: MCQ XP

Assessment Overview

At the conclusion of each chapter (Phase IV Reflect), you will be required to devise an MCQ. Each MCQ can draw on any material but must involve at least one element from the chapter being considered. Each MCQ should include appropriate feedback. You are then required to produce a short justification for the motivation behind each MCQ. This motivation should include a consideration of the rationale for the choice of distractors and reflection on the content.

The submitted MCQs are collated into an online quiz. You are then be expected to attempt to answer a personal subset (guided around 12) of the MCQs.

Feedback is instantaneous upon submitting your answer to each question. You will then rate each question on four domains (quality of feedback, difficulty, interest/relevance, uniqueness/ novelty). To encourage completion of this important reflection stage, maximum score is awarded for any missing ratings (advantaging the student who set the question). A dashboard provides feedback via scores for six domains (correctness, completion, plus the four ratings). An (open) weighting algorithm derives a credit (XP) score from these six domains. A leader board of the top XP scores is displayed in the dashboard.

Course Learning Outcomes

- CLO1 : Critique the Frequentist and Bayesian frameworks of probability.
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- CLO3 : Evaluate the role of Causation, Bias, and Confounding in Epidemiology.
- CLO4 : Investigate epidemiological risks and rates.

Detailed Assessment Description

Detailed instructions regarding this assessment will be provided on the course Openlearning site.

Submission notes

Short extension & Special consideration. These tasks have a short extension option.

Assessment information

Use of Generative Artificial Intelligence (AI) in the assessment

UNSW Pro-Vice Chancellor Education and Student Experience (PVCESE) provides guidance on the use of generative Artificial Intelligence in assessments.

FULL ASSISTANCE WITH ATTRIBUTION

Any output of generative AI software that is used within your assessment must be attributed with full referencing.

If the outputs of generative AI software form part of your submission and is not appropriately attributed, your marker will determine whether the omission is significant. If so, you may be asked to explain your understanding of your submission. 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.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. 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 tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.
If your Convenor has concerns that your answer contains passages of AI-generated text or media 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 and media 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.
For more information on Generative AI and permitted use please see here.

Ideas for multiple choice questions and R coding can be sought, for example from Google Colab and/or Microsoft Copilot with Commercial Data Protection enterprise edition.

Full attribution should be included at the end of the MCQ.

Final Course Phase IV Reflection

Assessment Overview

You will receive a variety of self-, peer-, and instructor feedback throughout the course on your

Phase 4 chapter reflections, using a standards based rubric designed specifcally for this purpose.

At the conclusion of the course, you are required to produce a 500-word meta-reflection of how you have met the course Learning Outcomes. You are required to submit a portfolio of your work, including the justification of motivation for each MCQ and chapter reflection. Feedback is provided using a standards based rubric similar that used in Phase IV of each chapter but tailored specifically for the needs of the meta-reflection.

Course Learning Outcomes

- CLO1 : Critique the Frequentist and Bayesian frameworks of probability.
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- CLO4 : Investigate epidemiological risks and rates.

Detailed Assessment Description

Detailed instructions regarding this assessment will be provided on the course Microsoft Teams site.

Assessment Length

500-word meta-reflection

Submission notes

Short extension & Special consideration. This task has a short extension option.

Assignment submission Turnitin type

Not Applicable

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.
If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for 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.
For more information on Generative AI and permitted use please see here.

General Assessment Information

Detailed instructions regarding assessments for this course are provided on the course learning management systems, Microsoft Teams or Openlearning.

Grading Basis

Standard

Requirements to pass course

Must achieve a total mark of at least 50 out of 100.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Workshop	Statistical Epidemiology 1
Week 2 : 16 September - 22 September	Workshop	Statistical Epidemiology 2
Week 3 : 23 September - 29 September	Workshop	Statistical Epidemiology 3
Week 4 : 30 September - 6 October	Workshop	Statistical Computing
Week 5 : 7 October - 13 October	Workshop	Introduction to Probability Theory
Week 6 : 14 October - 20 October	Other	Flex week
Week 7 : 21 October - 27 October	Workshop	Probability distribution functions
Week 8 : 28 October - 3 November	Workshop	Likelihood
Week 9 : 4 November - 10 November	Workshop	Frequentist Statistics
Week 10 : 11 November - 17 November	Workshop	Bayesian Statistics

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

The times and locations of classes can be found on myUNSW under Class Timetable.

The expected engagement for all UNSW 6UOC courses is 150 hours per term. This includes lectures, workshops, tutorials, readings, and completion of assessments.

Course Resources

Recommended Resources

Recommended resources for this course are provided on the course learning management systems.

Additional Costs

There are no additional costs associated with this course.

Course Evaluation and Development

Student feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

We use student feedback from myExperience surveys to develop and make improvements to the course each year. We do this by identifying areas of the course that require development from both the rating responses and written comments. Please spare a few minutes to complete the myExperience surveys for this course posted at the top of the Microsoft Teams homepage at the end of term.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Andrew Blance		CBDRH	+61 (2) 9065 8625	By appointment, requests via Teams	Yes	Yes

Other Useful Information

Academic Information

As a student of UNSW Medicine & Health you are expected to familiarise yourself with the contents of this course outline and the UNSW Student Code and policies and procedures related to your studies.

Student Code of Conduct

Throughout your time studying at UNSW Medicine & Health, you share a responsibility with us for maintaining a safe, harmonious and tolerant University environment. This includes within the courses you undertake during your degree and your interactions with the UNSW community, both on campus and online.

The UNSW Student Code of Conduct website provides a framework for the standard of conduct expected of UNSW students with respect to both academic integrity and your responsibility as a UNSW citizen.

Where the University believes a student may have breached the code, the University may take disciplinary action in accordance with the Student Misconduct Procedure.

The Student Conduct and Integrity Office provides further resources to assist you to understand your conduct obligations as a student at UNSW.

Academic Honesty and Plagarism

Academic integrity

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to the principle of academic integrity, and ethical scholarship of learning is fundamental to your success at UNSW Medicine & Health.

Plagiarism, contract cheating, and inappropriate use of generative AI undermine academic integrity and are not tolerated at UNSW. For more information see the Academic Integrity and Plagiarism toolkit.

In addition to the information you are required to review in your ELISE training, UNSW Medicine & Health strongly recommends that you complete the Working with Academic Integrity module before submitting your first assessment task.

Referencing

Referencing is a way of acknowledging the sources of information that you use to research your assignments. Preferred referencing styles vary among UNSW Medicine & Health disciplines, so check your course Learning Management System (e.g. Moodle or Open Learning) page for information on preferred referencing styles.

For further information on referencing support and styles, see the Current Student Referencing page.

Academic misconduct and plagiarism

At UNSW, academic misconduct is managed in accordance with the Student Misconduct Procedure. Allegations of plagiarism are generally handled according to the UNSW Plagiarism Management Procedure. Plagiarism is defined in the UNSW Plagiarism Policy and is not tolerated at UNSW.

Use of Generative AI and other tools in your assessment

UNSW has provided guiding statements for the use of Generative AI in assessments. This will differ, depending on the individual assessment task, your course requirements, and the course stage within your program.

Your course convenor will outline if and how you can use Generative AI in each of your assessment tasks. Inappropriate use of generative AI is considered academic misconduct.

Options for the use of generative AI include: (1) no assistance (for invigilated assessments); (2) simple editing assistance; (3) drafting assistance; and (4) full assistance with attribution; and (5) Generative AI software-based assessments. See your individual assessment descriptions for the level of permitted use of generative AI for each task and see your course Moodle (or Open Learning) page for the full instructions on permitted use of generative AI in your assessment tasks for this course.

Instructions may include a requirement to submit the original generative AI responses, or drafts of your original work, or provide on request.

Submission of Assessment Tasks

Short extensions and special consideration

Short extension

UNSW has a short extension procedure for submission of assessment tasks. Not all tasks are eligible, and eligible tasks have a predetermined extension length. UNSW Medicine and Health have set School-level extension lengths for eligible assessment tasks. See your course assessment descriptions for more information.

Students must check the availability of a short extension in the individual assessment task information for their courses.

Short extensions do not require supporting documentation. They must be submitted through Special Consideration before the assessment task deadline. No late applications will be accepted.

Late penalties apply to submission of assessment tasks without approved extension.

Special consideration

In cases where illness, misadventure or other circumstances beyond your control will prevent you from submitting your assessment by the due date and you require an extension, you need to formally apply for Special Consideration through myUNSW.

UNSW has a **Fit to Sit/Submit rule**, which means that by sitting or submitting an assessment on the scheduled assessment 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 and tests managed by your School.

Important information relating to Short Extension and Special Consideration is available here, including eligibility for Special Consideration, circumstances where students with Equitable Learning Plans can apply for Short Extensions and Special Consideration, and the appeals process.

Examinations

Information about the conduct of examinations in your course is provided on your course Moodle page.

Timed online assessment tasks

If you experience a technical or connection problem during a timed online assessment, such as a timed quiz, you can apply for Special Consideration. To be eligible to apply you need to contact the Course Convenor and advise them of the issue immediately. You will need to submit an application for Special Consideration immediately, and upload screenshots, error messages or other evidence of the technical issue as supporting documentation. Additional information can be found on: https://student.unsw.edu.au/special-consideration

Other assessment tasks

Late submission of assessment tasks

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 calendar day (including Saturday, Sunday and public holidays).

Late submissions penalties are capped at five calendar days (120 hours). This means that a student is not permitted to submit an assessment more than 5 calendar days (120 hours) after the due date for that assessment (unless extension or exemption previously agreed).

Failure to complete an assessment task

You are expected to complete all assessment tasks for your courses. In some courses, there will be a minimum pass mark required on a specific assessment task (a “hurdle task”) due to the need to assure clinical competency.

Where a hurdle task is applicable, additional information is provided in the assessment information on your course Moodle page.

Feedback on assessments

Feedback on your performance in assessment tasks will be provided to you in a timely manner. For assessment tasks completed within the teaching period of a course, other than a final assessment, feedback will be provided within 10 working days of submission, under normal circumstances.

Feedback on continuous assessment tasks (e.g. laboratory and studio-based, workplace-based, weekly quizzes) will be provided prior to the midpoint of the course.

Any variation from the above information that is specific to an assessment task will be clearly indicated in the course and assessment information provided to you on your course Moodle (or Open Learning) page.

Faculty-specific Information

Additional support for students

The university offers a wide range of support services that are available for students. Here are some links for you to explore.

- The Current Students Gateway: https://student.unsw.edu.au
- Academic Skills and Support: https://student.unsw.edu.au/academic-skills
- Student support: https://www.student.unsw.edu.au/support

- Student Wellbeing, Health and Safety: https://student.unsw.edu.au/wellbeing

Mind Smart Guides are a series of mental health self-help resources designed to give you the psychological flexibility, resilience and self-management skills you need to thrive at university and at work.

- Mind Smart Guides: https://student.unsw.edu.au/mindsmart
- Equitable Learning Services: https://student.unsw.edu.au/els
- Guide to studying online: https://www.student.unsw.edu.au/online-study

Most courses in UNSW Medicine & Health use Moodle as your Learning Management System. Guidance for using UNSW Moodle can be found on the Current Student page. Difficulties with Moodle should be logged with the IT Service Centre.

- Moodle Support: https://student.unsw.edu.au/moodle-support

The IT Service Desk is your central point of contact for assistance and support with remote and on-campus study.

- UNSW IT Service Centre: https://www.myit.unsw.edu.au/services/students

Course evaluation and development

At UNSW Medicine & Health, students take an active role in designing their courses and their overall student experience. We regularly seek feedback from students, and continuous improvements are made based on your input. Towards the end of the term, you will be asked to participate in the myExperience survey, which serves as a source of evaluative feedback from students. Your input to this quality enhancement process is valuable in helping us meet your learning needs and deliver an effective and enriching learning experience. Student responses are carefully considered, and the action taken to enhance educational quality is documented in the myFeedback Matters section of your Moodle (or Open Learning) course page.

School-specific Information

Laboratory or practical class safety.

For courses where there is a laboratory or practical-based component, students are required to wear the specified personal protective equipment (e.g., laboratory coat, covered shoes, safety glasses) indicated in the associated student risk assessments. The student risk assessments will be provided on the course Moodle page and must be read and acknowledged prior to the class.

Master of Science in Health Data Science courses

Courses in the Master of Science in Health Data Science are hosted through Open Learning. Additional resources are available on the Health Data Science Student Hub.

School Contact Information

School guidelines on contacting staff:

Course questions

All questions related to course content should be posted on Moodle (or Open Learning) or as directed by your Course Convenor.

In cases where email communication with course convenors is necessary, we kindly request the following:

- Use your official email address for any correspondence with teaching staff.
- We expect a high standard of communication. All communication should avoid using short-hand or texting language.
- Include your full name, student ID, and your course code and name in all communication.

Our course convenors are expected to respond to emails during standard working hours of Monday to Friday, 9am-5pm.

Administrative questions

If you have an administrative question about your program of study at the School please submit your enquiry online at UNSW Ask Us.

Complaints and appeals

Student complaints and appeals: https://student.unsw.edu.au/complaints

If you have any grievances about your studies, we invite you to address these initially to the Course Convenor. If the response does not meet your expectations, you may then contact:

School Grievance Officer, Prof Nick Di Girolamo (n.digirolamo@unsw.edu.au)

Master of Science in Health Data Science programs: School Grievance Officer, Dr Sanja Lujic (s.lujic@unsw.edu.au)