



UNSW

UNSW Course Outline

HDAT9600 Health Data Analytics: Statistical Modelling I - 2024

Published on the 12 May 2024

General Course Information

Course Code : HDAT9600

Year : 2024

Term : Term 2

Teaching Period : T2

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 : Postgraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course is offered in two modes: either face to face (on-campus) or fully online.

This course provides a sound grounding in the theory and practice of fitting statistical regression

models, with particular focus on the flexibility of generalised linear models (GLMs). Starting with linear regression, a major theme of the course is best practice in model fitting, including thorough exploratory data analysis, model assumption checking, data preparation and transformation, and careful attention to model adequacy and diagnostics. Emphasis is given to content-aware, purposive model building to inform model parameter selection. Logistic, binomial and Poisson models for count data are also covered. Effect modifications (interactions) and their meaning in a health context are explored. The presentation and visualisation of statistical models is considered, with emphasis on the explanatory insights that can be gained from well-constructed models. The final part of the course covers survival analysis and other time-to-event models.

Course Aims

The aim of this course is to equip you with a familiarity with the Generalised Linear Modelling (GLM) framework and its application in health research. Thus highlighting the flexible nature of the GLM and its utility in the analysis of health data.

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 : Construct generalised linear models with appropriate covariate sets in health research scenarios
CLO2 : Appraise model fit using a variety of model diagnostics
CLO3 : Compose narratives of generalised linear model interpretation within the framework of statistical inference
CLO4 : Visualise 'standard' statistical techniques as special simplified cases of the generalised linear model

Course Learning Outcomes	Assessment Item
CLO1 : Construct generalised linear models with appropriate covariate sets in health research scenarios	<ul style="list-style-type: none"> • Linear Models Assignment • Generalised Linear Models Assignment • Survival Analysis Assignment • Team Project
CLO2 : Appraise model fit using a variety of model diagnostics	<ul style="list-style-type: none"> • Linear Models Assignment • Generalised Linear Models Assignment • Survival Analysis Assignment • Team Project
CLO3 : Compose narratives of generalised linear model interpretation within the framework of statistical inference	<ul style="list-style-type: none"> • Linear Models Assignment • Generalised Linear Models Assignment • Survival Analysis Assignment • Team Project
CLO4 : Visualise 'standard' statistical techniques as special simplified cases of the generalised linear model	<ul style="list-style-type: none"> • Linear Models Assignment • Generalised Linear Models Assignment • Survival Analysis Assignment • Team Project

Learning and Teaching Technologies

Microsoft Teams | Google Colab

Learning and Teaching in this course

All course materials (or open access links thereto) are provided on the course learning management system, Microsoft Teams. All course announcements are posted to Microsoft Teams.

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
Linear Models Assignment Assessment Format: Individual	20%	Start Date: Not Applicable Due Date: See Microsoft Teams for date and time (Week 5)
Generalised Linear Models Assignment Assessment Format: Individual	25%	Start Date: Not Applicable Due Date: See Teams for date and time (Week 8)
Survival Analysis Assignment Assessment Format: Individual	25%	Start Date: Not Applicable Due Date: See Teams for date and time (Week 10)
Team Project Assessment Format: Group	30%	Start Date: Not Applicable Due Date: See Teams for date and time (Week 12)

Assessment Details

Linear Models Assignment

Assessment Overview

At the conclusion of the Linear Models section, you will complete a given set of assignment tasks relating to the development of Linear Models. The exercises will assess the content of the Linear Models section of the course and will consist of programming (in the R language) and interpretative tasks. These tasks will be reported in the form of a “literate programming” document which interleaves narrative text, program code and statistical outputs.

These exercises are reinforcement of the concepts and best practice covered. No new concepts or materials are introduced in the exercises. You will receive a score and individual feedback within 10 working days of submission. Outline solutions will also be provided.

Course Learning Outcomes

- CLO1 : Construct generalised linear models with appropriate covariate sets in health research scenarios
- CLO2 : Appraise model fit using a variety of model diagnostics
- CLO3 : Compose narratives of generalised linear model interpretation within the framework of statistical inference
- CLO4 : Visualise ‘standard’ statistical techniques as special simplified cases of the generalised linear model

Detailed Assessment Description

Detailed information about this assessment will be provided on the course learning management system (Microsoft Teams).

Submission notes

Refer to Teams for submission information.

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.

DRAFTING ASSISTANCE

As this assessment task involves some planning or creative processes, you are permitted to use software to generate initial drafts, ideas, structures, etc. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the software should not be a part of your final submission. It is a good idea to keep copies of your initial drafts to show your lecturer if there is any uncertainty about the originality of your work. If your marker has concerns that your answer contains passages of AI-generated text that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

Assignment submission Turnitin type

Not Applicable

Generalised Linear Models Assignment

Assessment Overview

At the conclusion of the Generalised Linear Models section, you will complete a given set of assignment tasks relating to the development of Generalised Linear Models. The exercises will assess the content of the Generalised Linear Models section of the course and will consist of programming (in the R language) and interpretative tasks. These tasks will be reported in the form of a “literate programming” document which interleaves narrative text, program code and

statistical outputs.

These exercises are reinforcement of the concepts and best practice covered. No new concepts or materials are introduced in the exercises. You will receive a score and individual feedback within 10 working days of submission. Outline solutions will also be provided.

Course Learning Outcomes

- CLO1 : Construct generalised linear models with appropriate covariate sets in health research scenarios
- CLO2 : Appraise model fit using a variety of model diagnostics
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possible penalties.

Assignment submission Turnitin type

Not Applicable

Survival Analysis Assignment

Assessment Overview

At the conclusion of the Survival Analysis section, you will complete a given set of assignment tasks relating to the development of Survival Analysis Models. The exercises will assess the content of the Survival Analysis section of the course and will consist of programming (in the R language) and interpretative tasks. These tasks will be reported in the form of a “literate programming” document which interleaves narrative text, program code and statistical outputs.

These exercises are reinforcement of the concepts and best practice covered. No new concepts or materials are introduced in the exercises. You will receive a score and individual feedback within 10 working days of submission. Outline solutions will also be provided.

Course Learning Outcomes

- CLO1 : Construct generalised linear models with appropriate covariate sets in health research scenarios
- CLO2 : Appraise model fit using a variety of model diagnostics
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Assignment submission Turnitin type

Not Applicable

Team Project

Assessment Overview

Towards the end of term, you will work in a small team to undertake an assessment which requires:

- Exploratory data analysis of a provided data set.
- Proposing appropriate regression models to address contextual questions, and proposing one or more underlying causal models which will be used to inform model construction.
- Fitting the proposed models and evaluating their technical attributes (goodness-of-fit, model diagnostics, predictive performance, as applicable etc).
- Reporting all the above in the form of a “literate programming” document which interleaves narrative text, program code and statistical outputs.

Each project will be awarded a team score (which will be the same for all team members). You will receive a team score and feedback within 10 working days of release of results.

Course Learning Outcomes

- CLO1 : Construct generalised linear models with appropriate covariate sets in health research scenarios
- CLO2 : Appraise model fit using a variety of model diagnostics

- CLO3 : Compose narratives of generalised linear model interpretation within the framework of statistical inference
- CLO4 : Visualise ‘standard’ statistical techniques as special simplified cases of the generalised linear model

Detailed Assessment Description

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Submission notes

Refer to Teams for submission information.

Assessment information

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Assignment submission Turnitin type

Not Applicable

General Assessment Information

Detailed instructions regarding assessments for this course are provided on the course learning management system (Microsoft Teams).

For student information on results, grades, and guides to assessment see: <https://>

Grading Basis

Standard

Requirements to pass course

In order to pass this course students must:

- achieve a composite grade of at least 50 out of 100.
- meet any additional requirements specified in the assessment details section and on learning management system (Microsoft Teams).

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 27 May - 2 June	Workshop	Exploratory Data Analysis
Week 2 : 3 June - 9 June	Workshop	The linear model
Week 3 : 10 June - 16 June	Workshop	Fit & diagnostics
Week 4 : 17 June - 23 June	Workshop	Interpretation
Week 5 : 24 June - 30 June	Workshop	Logistic
Week 6 : 1 July - 7 July	Other	Flex week (no class)
Week 7 : 8 July - 14 July	Workshop	Some other GLMs
Week 8 : 15 July - 21 July	Workshop	Non-parametric survival
Week 9 : 22 July - 28 July	Workshop	Semi-parametric & parametric survival
Week 10 : 29 July - 4 August	Workshop	Review

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 workshops, tutorials, readings, and completion of assessments.

Course Resources

Recommended Resources

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

system (Microsoft Teams).

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 Bla nce		CBDRH, Level 2, AGSM Building	via Microsoft Teams	By appointment, requests via Microsoft 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 Plagiarism

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 your assessment tasks. Options for the use of generative AI include: (1) no assistance; (2) simple editing assistance; (3) planning assistance; and (4) full assistance with attribution.

You may be required to submit the original generative AI responses, or drafts of your original work. Inappropriate use of generative AI is considered academic misconduct.

See your course Moodle (or Open Learning) page for the full instructions for individual assessment tasks for your course.

Submission of Assessment Tasks

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.

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>

Examinations

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

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](#).

Recording of lectures, tutorials and other teaching activities (MSc. HDS only)

Lectures, tutorials and other teaching activities may be recorded. Students should be advised that they are consenting to the recording by their enrolment in the course or participation in the activity. The purpose of audio and video recordings is to enhance the student experience by supporting engaged learning in an online teaching environment and ensure equitable access to all course resources for our students. If you have concerns about accessing course recordings, or being recorded, please contact the Course Convenor.

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)

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