STAT8127

Survival Analysis

Session 1, Online-flexible 2023

School of Mathematical and Physical Sciences

Contents

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General Information

Unit convenor and teaching staff
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Credit points
10

Prerequisites
(BCA808 or STAT8609) or ((admission to MAppStat or MScInnovationStat or GradCertAppStat or GradDipAppStat or MActPrac or BMathScMAppStat) and (STAT6175 or STAT811 or STAT8111))

Corequisites
STAT6110 or STAT806 or STAT810 or STAT8310 or BCA817 or STAT8603

Co-badged status
STAT7127

Unit description
This unit explores biostatistical applications of survival analysis. These begin with the Kaplan-Meier curve definition and its extension to the comparison of survival of several groups of subjects. The Cox proportional hazards model is introduced as a method for handling continuous covariates, and parametric accelerated failure-time models are covered. Time-dependent covariates and multiple outcomes are also considered.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Demonstrate understanding of survival data by identification and application of correct models.

ULO2: Summarise and display survival data using nonparametric methods.

ULO3: Analyse survival data using the Cox proportional hazards model, including time-dependent covariates and multi-event models.

ULO4: Analyse survival data using parametric models.

ULO5: Produce appropriate displays for publication.

ULO6: Determine sample size for simple survival analysis.

General Assessment Information

Requirements to Pass this Unit

To pass this unit you must:

- Achieve a total mark equal to or greater than 50%

Late Assessment Submission Penalty

Please be aware that we have adopted the Faculty policy on late submissions of assignments.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of 0 will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

Assessments where Late Submissions will be accepted.

- Assignment 1 due date: week 4 - Yes, standard Late Penalty applies
- Assignment 2 due date: week 8 - Yes, standard Late Penalty applies
- Assignment 3 due date: week 13 - Yes, standard Late Penalty applies

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Assessment Tasks

Name	Weighting	Hurdle	Due
Assignment 1	30%	No	week 4
Assignment 2	40%	No	week 8
Assignment 3	30%	No	week 13

Assignment 1

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 10 hours

Due: **week 4**
Weighting: **30%**

Simple analyses performed by hand to demonstrate understanding of the basic principles of survival analysis and analysis using statistical software of univariate and simple Cox models.

On successful completion you will be able to:
- Demonstrate understanding of survival data by identification and application of correct models.
- Summarise and display survival data using nonparametric methods.
- Analyse survival data using the Cox proportional hazards model, including time-dependent covariates and multi-event models.

Assignment 2

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 14 hours
Due: **week 8**
Weighting: **40%**

Full statistical analysis of a survival data set. This requires choosing an appropriate survival model, performing diagnostic tests and modifying the model to correctly satisfy the assumptions of the Cox model and presenting the results for presentation to a general audience.

On successful completion you will be able to:
- Demonstrate understanding of survival data by identification and application of correct models.
- Summarise and display survival data using nonparametric methods.
- Analyse survival data using the Cox proportional hazards model, including time-dependent covariates and multi-event models.

Assignment 3

Assessment Type [1]: Quantitative analysis task
Indicative Time on Task [2]: 10 hours
Due: **week 13**
Weighting: **30%**

Statistical analyses covering advance material including multiple events, time-dependent covariates, parametric models, presentation of results and sample size calculations.

On successful completion you will be able to:
- Analyse survival data using parametric models.

- Produce appropriate displays for publication.

- Determine sample size for simple survival analysis.

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment

- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Classes

Lectures: Students enrolled in this unit are required to watch the pre-recorded lecture recordings on weekly basis. Also, students are required to read the Module notes.

Unit content: The unit is divided into **7 modules**, summarised in more detail below. Each module will involve 2 weeks of study, except for Module 7 which is only for 1 week, and generally includes the following material:

1. "Module Notes" describe concepts and methods, and possibly including some exercises of a more "theoretical" nature.

2. Sometime, "Selected Readings" from published articles or textbooks will also be included.

3. One or more "Extended Examples" illustrating the concepts/methods introduced in the notes and including more practically oriented exercises.

Study materials for all Modules are downloadable from the eLearning unit site. Assignments and supplementary material, such as datasets will be posted to the unit site. Please note that we may not be able to post copies of copyright material (for example journal articles and book extracts)—for these you will have to rely on resources from your home university's library.

Recommended approaches to study: Students should work through each module systematically, following the module notes and any readings referred to, and working through the accompanying exercises. *You will learn a lot more efficiently if you tackle the exercises systematically as you work through the notes.* You are encouraged to post any content-related questions to eLearning, whether they relate directly to a given exercise, or are a request for clarification or further explanation of an area in the notes. You should also work through all of the computational examples in the notes for yourself on your own computer.

Outline solutions to the exercises in each module (except those to be submitted for assessment, as described below) will be posted online at the midway point of the allocated time period for the module. This is intended to encourage you to attack the exercises independently (or via the

eLearning site), and yet not make you wait too long to see the sketch solutions.

Technology Used and Required

The software used in this unit STATA. For Macquarie Uni students, Stata can be downloaded for free from the university through the following link: https://students.mq.edu.au/support/technology/software/stata

Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to your lecturers from your university email address.

Questions about administrative aspects or course content can be emailed to the coordinator, and when doing so please use "SVA:" in the Subject line of your email to assist in keeping track of our email messages. Coordinator/s will be available to answer questions related to the module notes and practical exercises, and to address any other issues that require clarification. However, please note that instructors are not necessarily available every day of the week and you should expect that it may take a day or so to respond to questions (possibly longer over weekends and during breaks!).

We strongly recommend that you post content-related questions to the Discussions tool in the eLearning site. In 2022 we are using the Learning Management system hosted by the University of Sydney and Macquarie University. You should already be familiar with the university student learning system from previous units.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Week	Module	Assessment
1	Module 1	
2	Module 1 (cont)	Assignment 1 available

3	Module 2	
4	Module 2 (cont)	Assignment 1 due
5	Module 3	Assignment 2 available
6	Mid semester break	
7	Module 3 (cont)	
	Module 4	
8	Module 4 (cont)	
9	Module 5	Assignment 2 due and Assignment 3 available
10	Module 5 (cont)	
11	Module 6	
12	Module 6 (cont)	
13	Module 7	Assignment 3 due

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.e du.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing an d maths support, academic skills development and wellbeing consultations.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://stu dents.mq.edu.au/support/

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Changes since First Published

Date	Description
14/03/2023	- Updated the Late Assessment Submission Penalty to align more with the Faculty Policy. - Updated with information on how to download Stata.