



Stat811/411 Generalized Linear Models

Course Information: Semester 2, 2006

Lecturer

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Recommended reading

There is no prescribed text for this unit. The following are useful references:

- McCullagh, P. and Nelder, J.A. **Generalized Linear Models**, 2nd edition, Chapman & Hall.
- Dobson, A. J. (1990). **An Introduction to Generalized Linear Models**, 2nd edition, Chapman & Hall.
- Lindsey, J.K. (1997). **Applying Generalized Linear Models**, Springer.
- Online SAS manual:
<http://support.sas.com/onlinedoc/913/docMainpage.jsp>

The above texts (with the exception of the SAS manual) are on 3-day loan.

Some references to texts on Generalized Linear Models using SAS are given on <http://www.statsci.org/glm/books.html>

Distance mode

Distance students will be receiving printed course notes via mail. You will be alerted by email when material has been mailed out, so if you do not receive these within a few days then please contact Lesley Mooney, the Postgraduate Administrator in the Department of Statistics (phone: (02) 9850 8550 e-mail lmooney@efs.mq.edu.au).

Completed assignments may mailed to the lecturer at Department of Statistics, Macquarie University, NSW 2109, Australia or e-mailed or faxed.

On-campus mode

Lectures will be held on Thursday evenings. From 6pm to approximately 7.30pm the lecture will be in E5A 107. After that there is a computing session, held in E4B 118, till 9pm.

Software

We will be using the software SAS version 9. Should you wish to purchase your own version of SAS, you can obtain a fully working version (with one year's licence). Please see separate handout concerning this.

WebCT

We will be using WebCT for bulletin board discussions, and posting of assignments, solutions and data sets. The link is <http://online.mq.edu.au/webct/homearea/homearea?> which you should bookmark.

You are encouraged to use the bulletin board for discussions on the course material. Remember that if you are confused about something, the chances are that other students are also confused. Everybody benefits from the discussions, and you should not be embarrassed to admit that you do not understand a concept.

Your WebCT login is your Student ID Number (as found on your Campus Card). Your WebCT password is the same password used to access myMQ, as supplied to you on enrolment.

iLecture: digital (audio) recordings of lectures

Audio recordings of the lectures will be available on the WebCT site, the day after the lecture is delivered. Instructions on the use of the iLecture system is provided in the iLecture Quick Guide, accessed from <http://online.mq.edu.au/uw/quickguides.html> .

Student IT help

Should you be experiencing difficulty with use of WebCT or iLecture, you can get help from:

- * **Phone:** (02) 9850 HELP (4357) or Freecall: 1800 063 191
- * **Web:** <http://www.lib.mq.edu.au/general/ithelp/>
- * **Internet Chat:** MSN Messenger at ithelp@mq.edu.au
- * **Face to face:** IT Help Desk, Level 1, Library
- * **Email:** Just Ask form <http://www.library.mq.edu.au/justask/>
- * **24x7 Follow the Sun Helpdesk email:** ithelp@mq.edu.au

Web sites

The public web site for the course is at <http://www.stat.mq.edu.au/units/stat811/> . A very helpful web site is <http://www.statsci.org/glm/> .

Timetable

Week	Lecture	Assessment
1	3 August	
2	10 August	Assignment 1 handed out
3	17 August	
4	24 August	Assignment 1 handed in
5	31 August	
6	7 September	Assignment 2 handed out
7	14 September	
Mid-semester break		
8	5 October	Assignment 2 handed in
9	12 October	
10	19 October	Assignment 3 handed out
11	26 October	
12	2 November	Assignment 3 handed in
13	9 November	

Unit contents

Week	Contents
1	The classical normal linear model
2	Introduction to GLMs The framework of generalized linear models is introduced, and the theory behind maximum likelihood estimation of the parameters started.
3	Maximum likelihood estimation of the parameters; Poisson regression for count data
4	Inference; comparison of models The deviance as a measure of fit; hypothesis testing
5	Model checking Definition of residuals in glms; checking for violation of model assumptions
6	Model selection; overdispersion Selection of models via AIC; the phenomenon of overdispersion; compound Poisson models to overcome it; the negative binomial model for counts
7	Overdispersion contd; binary responses Quasi-likelihood as an alternative method to overcome overdispersion; logistic regression for binary responses

Week	Contents
8	Logistic regression contd
9	Ordinal and categorical responses Models in which the response is ordinal (e.g. none/mild/moderate/severe) or categorical (e.g. walk/bus/train/car)
10	Correlated data Models for longitudinal data, and other data structures in which there is clustering or correlation between observations
11	Correlated data contd
12	Generalized additive models; more correlated data Models in which no parametric form of the systematic part of the model is specified; more on correlated data
13	Revision

Examination

There will be a two-hour sit-down examination, and a take-home examination which you have four days to complete. You will be permitted to bring an A4 sheet of notes, handwritten or typed, on both sides, into the sit-down examination.

Please note that students who have not performed satisfactorily in the assignments, will not be permitted to write either the sit-down or the take-home examination. Any student who is to be excluded from the examinations, will be notified in writing of this after the due date of the last assignment.

Assessment will be as follows :

Three assignments	45%
Examination:	
Sit-down component	25%
Take-home component (4 days)	30%

In order to pass the unit, students need to perform satisfactorily on all components of assessment (assignments and examinations).