

# **STAT6090 Generalised Linear Models**

## **Module Outline**

### **1. Aims and Learning Outcomes**

The aim of this module is to introduce you to the application and theory of generalised linear models and the use of specific generalised linear models and associated techniques. The module will also involve some practical data analysis using SPSS.

On successful completion of this module you should:

- know how to fit and interpret specific generalised linear models to datasets
- understand the basic theory of generalised linear models.

### **2. Prerequisites**

STAT6035 Regression Modelling is a prerequisite for this module.

### **3. Lecturers**

Dr Gabriele Durrant, Department of Social Statistics and Demography (School of Social Sciences) and S3RI will teach the main part of the module. (Room 4039, Building 58; [g.durrant@southampton.ac.uk](mailto:g.durrant@southampton.ac.uk)). Particular sessions will be taught by Dr Olga Maslovskaya, ESRC National Centre for Research Methods ([om206@southampton.ac.uk](mailto:om206@southampton.ac.uk)) and Dr Jamie Moore, ESRC Administrative Data Research Centre ([J.C.Moore@soton.ac.uk](mailto:J.C.Moore@soton.ac.uk)).

Vasiliki Koutra ([V.Koutra@soton.ac.uk](mailto:V.Koutra@soton.ac.uk)) will be helping with the computer workshops providing advice on how to use the statistical software SPSS.

#### **4. Teaching and Learning Methods**

The course consists of a series of lectures and integrated computer workshops. The lectures will cover the applied and theoretical aspects of the course, and the computer workshops will involve data analysis using the techniques introduced in the lectures.

#### **5. Module Structure**

The module covers the following topics:

- revisiting linear models
- cross-classification and measure of association
- logistic regression
- models for ordinal responses
- multinomial logistic regression
- simple models for counts
- generalized linear models
- log-linear models contingency tables
- goodness-of-fit and model selection

#### **6. Assessment Methods**

100% coursework which will involve performing a number of analyses using SPSS with generalised linear models and writing a short report on your findings.

#### **Resit Arrangements**

If you find yourself in the unfortunate position of having to resit this module, then you will be set another coursework.

## 7. Recommended Reading

The copies of the lecture slides are essential reading. The following is a list of recommended text books in this area. Most, if not all, of these books should be available in the University library.

1. **Agresti, A. (2007). *An Introduction to Categorical Data Analysis*, 2<sup>nd</sup> edition. Wiley.**  
Covers the basic topics in STAT6036 at an introductory level.  
QA 276 AGR (Hartley Library: 1 copy is available on long loan, 1 copy on short loan (course collection), 3 copies on one week loan, and Internet e-book)
2. **Agresti, A. (2013). *Categorical Data Analysis*, 3<sup>rd</sup> edition. Wiley.**  
Covers logistic regression, loglinear models, multinomial logistic regression and models for ordinal responses at an advanced level.  
QA 276 AGR (Hartley Library: 3 copies on one week loan, 1 copy on long loan, and Internet e-book)  
One copy of the 2<sup>nd</sup> edition of the book in MOFFSTAT library in Building 39.
3. **Dobson, A.J. and Barnett, A. (2008). *An Introduction to Generalized Linear Models*, 3<sup>rd</sup> edition. Chapman & Hall.**  
HA 33 DOB (1 copy on long loan, 6 copies on one week loan)
4. **Krzanowski, W.J. (1998). *An Introduction to Statistical Modelling*. Arnold.**  
HA 33 KRZ (3 copies on one week loan)
5. **McCullagh, P. and Nelder, J.A. (1989). *Generalized Linear Models*, 2<sup>nd</sup> edition. Chapman & Hall.**  
Covers most of the topics in STAT6039 at an advanced level.  
HA 33 MACC (2 copies on one week loan)
6. **Miller, J.E. (2013). *The Chicago Guide to Writing about Multivariate Analysis*, 2<sup>nd</sup> edition. Chicago, London: University of Chicago Press.**  
T 11 MIL (4 copies on one week loan, 2 copies on long loan)

A useful electronic resource for material covered during the course (in effect, an electronic statistics textbook) is available online at <http://www.statsoft.com/textbook/stathome.html>

I would encourage you to report to the Library (and to me) books that you are finding difficult to get hold of – this will alert the Library to a potential excess demand over supply.

**Can't find a book in the Library...**

**The book I want is on loan to someone else.** Use WebCat to place a hold on the book even if you think it won't be returned in time (this will notify staff that the book is in demand). If you think more copies of a text may be required, please also tell your course tutor.

**WebCat says it's on the shelf but it's not.** Start by asking at the Enquiry Desk. If Library staff can't find the book, look again the next day. If you still can't find it, go back to the Enquiry Desk and say that you would like to report the book missing. Library staff will then search again and let you know the outcome.

**Other problems using the Library...** please ask at the Enquiry Desk for help or contact your Subject Librarian, Harry Gibbs – [hgibbs@soton.ac.uk](mailto:hgibbs@soton.ac.uk)

## 8. Procedures for Problems Associated with the Module

If you have any kind of problem with this module, you should raise the issue with me in the first instance. If you are not happy with the outcome, you should approach the MOffStat Programme Coordinator, Dr Paul Smith. If you are still not happy, you should take up the issue with the Head of Teaching Programmes for Social Statistics and Demography.

If you have a major difficulty during the module, e.g. a health problem that prevents you from attending lectures or seriously interferes with your work, you should make sure you obtain the relevant documentation (e.g. a medical certificate), fill in a special considerations form, bring these to your tutor (Dr Paul Smith) for signature.

## 9. Blackboard Unit

To access the Blackboard site use Internet Explorer and enter the web address <http://blackboard.soton.ac.uk/>. Materials for all of the computer workshops, including the worksheets, the datasets, and the solutions, will be made available on the MSc Official

Statistics Blackboard unit site. Materials for the assignment will also be placed there.

Important notices including last minute changes to the timetable will be posted on the site - you should therefore check regularly for any new announcements and new materials. If you cannot access the site for any reason please contact us.

## **10. Academic Integrity**

The University places the highest importance on the maintenance of academic integrity in the conduct of its affairs, and has produced a guide to issues of academic integrity for students.

This can be found in the University Calendar available online at

<http://www.calendar.soton.ac.uk/sectionIV/part8a.html>, and this is reproduced in the MSc

Official Statistics booklet available on the School of Social Sciences intranet at

<http://www.soton.ac.uk/socscinet>. Please familiarise yourself with what is expected of you in

this regard by reading through this information. Your attention is drawn particularly to

Appendix 1 of the Academic Integrity Statement, which outlines those things which you must seek to avoid, including cheating and plagiarism.

You must take particular care in using sources in essays, reports and in your dissertation.

Remember that plagiarism includes not only verbatim copying but also direct paraphrasing of a source. Verbatim quotes from a source should always be in quotation marks, with the source indicated, and should be used only occasionally in an essay or other report. Detailed advice on appropriate referencing in essays and dissertations is given in the Department of Social Statistics and Demography "Guidelines on writing essays".

Note that it is not acceptable that you read and gain ideas for your coursework from another student's finished work. Copying includes using another student's computer program, output or graphics. If academic integrity is deemed to have been breached, there are a range of penalties that may be applied. If you are unsure about anything, ask - I will be happy to explain and discuss.