# Module Specification

## ABOUT THIS DOCUMENT

This module specification applies for the academic year 2019-20

**Last revised** 24 August 2019 by Chris Frost

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## GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Module name</th>
<th>Generalized Linear Models</th>
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<tbody>
<tr>
<td>Module code</td>
<td>2462</td>
</tr>
<tr>
<td>Module Organiser</td>
<td>Professor Chris Frost</td>
</tr>
<tr>
<td>Contact email</td>
<td><a href="mailto:chris.frost@lshtm.ac.uk">chris.frost@lshtm.ac.uk</a></td>
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<tr>
<td>Home Faculty</td>
<td>Epidemiology &amp; Population Health</td>
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<tr>
<td>Level</td>
<td>Level 7 (postgraduate Masters ‘M’ level) of the QAA <a href="http://www.qaa.ac.uk">Framework for Higher Education Qualifications</a> in England, Wales &amp; Northern Ireland (FHEQ)</td>
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<tr>
<td>Credit</td>
<td>15 credits</td>
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<tr>
<td>Accreditation</td>
<td>Not currently accredited by any other body</td>
</tr>
<tr>
<td>Keywords</td>
<td>(in alphabetical order; main in <strong>bold</strong>) Epidemiology, <strong>Statistics (statistical methodology)</strong>; Quantitative methods</td>
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</table>

## AIMS, OBJECTIVES AND AUDIENCE

### Overall aim

To equip students with the necessary skills to (i) understand the principles of Generalized Linear Modelling, and (ii) be able to analyse data using Generalized Linear Models.

### Intended learning outcomes

By the end of this module, students should be able to:

- demonstrate an understanding of the theoretical basis of Generalized Linear Models
- use Generalized Linear Models for analysis of discrete data
- present results clearly and accurately in a structured report, such as might form the basis of a report by a statistical consultant

### Target audience

This module is intended for people with both mathematical (up to first year undergraduate level) and statistical background (undergraduate degree level in joint mathematics/statistics for example) intending to pursue a career in medical statistics

## CONTENT

### Session content

The module includes sessions addressing the following topics:

- Formalisation of Generalized Linear Models
- Log likelihood and deviance
- Comparison of nested regression models
- Logistic regression for binary data
- Ordinal and multinomial logistic regression
- Poisson regression for rates
- Linking research questions to analysis strategies
- Marginal and conditional estimates
- Confounding, adjustment and non-collapsibility
- Model checking and assessment of model performance
- Application of logistic regression to prospective and case-control studies
- Matched studies and conditional logistic regression

### TEACHING, LEARNING AND ASSESSMENT

| Study resources provided or required | Module Information can be found on the Virtual Learning Environment (Moodle) containing information about each session and key references for the module. Information on Moodle contains a fuller explanation of the topics covered in the lectures, together with practical exercises.

Module books:
| Teaching and learning methods | Learning will generally be based on relevant computer practicals. Approximately half of the contact time will be spent in the form of practicals. |
| Assessment details | Students will carry out one assessment, consisting of an analysis of data together with submission of a report.
For students on MSc Medical Statistics, the module material will additionally be examined in Paper 2 in the June written examination.
Resit/deferred/new attempts - The task will be a data analysis report. |
| Assessment dates | The assessment will be set during week 3 of the module. The deadline for submission will be the final day of the module.
Resit/deferred/new attempts - the next assessment deadline for coursework will be during mid/late September of the current academic year. The next assessment date for Paper 2 of the written examination will be early/mid-June in the following academic year. |
| Language of study and assessment | English (please see ‘English language requirements’ below regarding the standard required for entry). |

### TIMING AND MODE OF STUDY

<p>| Duration | 5 weeks at 2 days per week |
| Dates | Monday morning to Tuesday afternoon |
| Timetable slot | Term 2 - slot C1 |</p>
<table>
<thead>
<tr>
<th><strong>Mode of Study</strong></th>
<th>The module is taught face-to-face in London. Both full-time and part-time students follow the same schedule.</th>
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</thead>
</table>
| **Learning time** | The notional learning time for the module totals 150 hours, consisting of:  
  - Contact time ≈ 50 hours  
  - Directed self-study ≈ 60 hours  
  - Self-directed learning ≈ 10 hours  
  - Assessment, review and revision ≈ 30 hours |

**APPLICATION AND ADMISSION**

<table>
<thead>
<tr>
<th><strong>Pre-requisites</strong></th>
<th>A knowledge of linear regression, analysis of variance, likelihood theory and simple methods of analysing quantitative and categorical data is essential.</th>
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<tr>
<td><strong>English language requirements</strong></td>
<td>A strong command of the English language is necessary to benefit from studying the module. Applicants whose first language is not English or whose prior university studies have not been conducted wholly in English must fulfil LSHTM’s English language requirements.</td>
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<tr>
<td><strong>Student numbers</strong></td>
<td>30 (numbers may be capped due to limitations in facilities or staffing)</td>
</tr>
</tbody>
</table>
| **Student selection** | Preference will be given to LSHTM MSc students; this module is compulsory for students studying for the MSc Medical Statistics. Other applicants meeting the entry criteria will usually be offered a place in the order applications are received, until any cap on numbers is reached. Applicants may be placed on a waiting list and given priority the next time the module is run.  
Partial Registration (partial participation) by LSHTM research degree students is allowed for this module. |