## Module Specification

### GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Module name</th>
<th>Advanced Statistical Methods in Epidemiology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>EPM304</td>
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<tr>
<td>Module Organiser(s)</td>
<td>Sian Floyd, Daniel Grint</td>
</tr>
<tr>
<td>Contact email</td>
<td>The LSHTM distance learning programmes and modules are run in collaboration with the University of London. Enquiries may be made via their Student Advice Centre at: <a href="https://london.ac.uk/contact-us">https://london.ac.uk/contact-us</a> (Enquiries from London-based LSHTM MSc or research students regarding study of DL modules should be emailed to <a href="mailto:distance@lshtm.ac.uk">distance@lshtm.ac.uk</a>)</td>
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<tr>
<td>Home Faculty</td>
<td>Faculty of Epidemiology and Population Health London School of Hygiene &amp; Tropical Medicine <a href="http://www.lshtm.ac.uk/eph/">http://www.lshtm.ac.uk/eph/</a></td>
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<tr>
<td>Level</td>
<td>This module is at Level 7 (postgraduate Masters level) of the QAA <a href="https://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>LSHTM award 15 credits on successful completion of this module.</td>
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<tr>
<td>Accreditation</td>
<td>Not currently accredited by any other body.</td>
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<tr>
<td>Keywords</td>
<td>Epidemiology, Statistics, Quantitative methods.</td>
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### AIMS, OBJECTIVES AND AUDIENCE

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<tr>
<th>Overall aim</th>
<th>This module aims to enable students to understand, apply, and interpret the results of a range of relatively advanced techniques for the design and analysis of epidemiological studies.</th>
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<td>Intended learning outcomes</td>
<td>On completion of this module students should be able to:</td>
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<td>• Choose and then apply an appropriate regression model, and interpret the results from this model, for the analysis of individually and frequency-matched case-control studies, cohort studies, cross-sectional surveys, and cluster-randomised trials, using appropriate computer software,</td>
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<td>• Understand when individual observations are not independent, and how to account for this in statistical analysis of cohort and cross-sectional studies by using methods that account for correlation,</td>
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<td>• Understand when a cluster randomised trial (CRT) may be appropriate, and how to design them and analyse data from them,</td>
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<td>• Understand the difference between additive and multiplicative models, and how to choose which is most appropriate,</td>
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<td>• Plan a strategy of analysis to answer an epidemiological research question, using an appropriate choice and order of statistical analyses to control for confounding and account for interaction, informed by a causal inference framework,</td>
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<td>• Estimate the population-level risk attributable to an individual or household characteristic,</td>
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<td>• Review, summarise, and synthesise information across several studies using meta-analysis.</td>
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<td>Target audience</td>
<td>This is an advanced module intended for students with a strong grasp of quantitative methods, who have previously completed the module in Statistical Methods in Epidemiology.</td>
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<td>CONTENT</td>
<td>Module content is structured around the self-study sessions listed below:</td>
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| Session content | AS01 Framework for regression modelling  
AS02 Strategies of analysis  
AS03 Conditional logistic regression  
AS04 Stratifying on time for cohort studies  
AS05 Further Poisson regression  
AS06 Cox regression  
AS07 Further issues for Cox regression  
AS08 Additive and multiplicative models  
AS09 Analysis of correlated data  
AS10 Cluster-randomised trials  
AS11 Population attributable fractions  
AS12 Meta-analysis and systematic reviews  
AS13 Quantitative analysis  
AS14 Causal Inference  
These sessions are followed by one optional session:  
AS15 Missing data |
| TEACHING, LEARNING AND ASSESSMENT | The Moodle Virtual Learning Environment (VLE) contains the key materials and resources for EPM304 as follows:  
- Interactive study material, referred to as Computer Assisted Learning (CAL), which is the key learning material for the module. The CAL sessions are accessible online and available to download also.  
- Workbook (contain practical exercises to work through using the statistical software Stata)  
- Readings (via the LSHTM online library)  
- Discussion forums  
- Assignments  
- Past examination papers and examiner reports.  
The following is also provided (if not previously provided for other EPM or CTM modules):  
- Stata software  
Moodle can be accessed from the first week of October, after module registration.  
Students who are taking this as an individual module or as part of the MSc CT programme also have online access to the EPM1 and EPM2 computer-based sessions (this access will exclude tutor support and associated readings/workbooks/ text books). |
| Teaching and learning methods | Learning is self-directed against a detailed set of learning objectives using the materials provided. The key learning methods are:  
- Reading and reflecting on CAL (computer-assisted learning) materials which introduce, explain and apply the principles and methods covered in the module.  
- Reading and reflecting on paper-based materials which support the learning in the CAL sessions.  
- Completing paper and computer-based practical exercises. |
- Accessing academic support which is available from the module tutors through the web-based discussion forums and occasional real-time sessions (using Collaborate Ultra) in which students are encouraged to participate.
- Completing the formative assignment and reflecting on written feedback from module tutors.
- Completing the assessed assignment and reflecting on written feedback from module tutors.

### Assessment details

Formal assessment of the module will be by one assessed assignment contributing 100% of module marks. If a student fails the module overall, they are allowed one further attempt at the assignment.

Prior to 2019/20, students were required to sit an unseen written examination (70% of module marks) and submit an assessed assignment (30% of module marks). Students who registered for EPM304 prior to 2019/20 must note the following:

- **A student registered for EPM304 prior to 2019/20 who has not attempted any element of the EPM304 assessment** will be required to complete the assessed assignment only (100% of the module marks).
- **A student registered for EPM304 prior to 2019/20 who has completed one element of assessment but not the other** (i.e. the unseen written examination or the assessed assignment) must still complete both elements of assessment.
- **A student registered for EPM304 prior to 2019/20 who has obtained a GPA of between 1.0 and 1.99 for the module overall**, must resit the failed element(s) unless the overall EPM304 GPA is compensatable.
- **A student registered for EPM304 prior to 2019/20 who has previously obtained a GPA of less than 1.0 on the assessed assignment or the module overall**, must resit the failed element(s).

### Assessment dates

Assignments for this module can be submitted only once annually, no later than 30 April and must be submitted via the online Assignment Management System.

The following examination information is applicable only for those students who registered for EPM304 prior to 2019/20 and who are still required to sit an examination (see Assessment Details above):

Unseen written examinations for DL modules are held once a year, in June (including resits). Examinations are normally taken in a student’s country of residence, in one of over 650 examination centres worldwide (arranged mainly through Ministries of Education or the British Council). A list of examination centres can be found at [https://london.ac.uk/current-students/examinations/examination-centres](https://london.ac.uk/current-students/examinations/examination-centres).

A local fee will be payable direct to the examination centre. This fee is in addition to the programme/module fee and is set by, and paid directly to, the individual examination centres. The level of local examination centre fees varies across the world and neither the University of London nor the LSHTM have any control over the fee amount.

For students who are required to re-sit, or granted a deferral or new attempt at the written examination, the next examination date will be the following June.

### Language of study and assessment

English (please see ‘English language requirements’ below regarding the standard required for entry).
TIMING AND MODE OF STUDY

Duration
Students may start their studies at any time from access/receipt of study materials (made available annually usually in October, depending on date of registration) and work through the material until completion of their assessment (see in the ‘Dates’ section below for more details).

Students registering after September (continuing and individual module students only) should note that introductory messages, and some online activities (for example discussion forums and/or real-time welcome sessions) may have already taken place before they get access to the Virtual Learning Environment (Moodle). All such messages and recordings (where applicable) will be available to access throughout the study year.

Dates
Tutorial support for distance learning modules is available from the beginning of October through to the assignment submission deadline 30 April. For those students who registered prior to 2019/20 and who are sitting the examination, tutorial support will be available until the examination in June.

Mode of study
By distance learning.

Learning time
The notional learning time for the module is 150 hours, consisting of:

- **Directed self-study** (reading and working through the provided module material) ≈ 75 hours
- **Self-directed learning** (general reading around the subject, library, Moodle discussion forums) ≈ 25 hours
- **Assessment, review and revision** ≈ 50 hours

APPLICATION, ADMISSION AND FEES

Pre-requisites
**Epidemiology students** must have passed EPM101 *Fundamentals of Epidemiology* and EPM102 *Statistics for Epidemiology* [previously entitled *Statistics with Computing*], and should have studied and have an understanding of EPM103 *Practical Epidemiology*, EPM105 *Writing and reviewing epidemiological papers* and EPM202 *Statistical Methods in Epidemiology* prior to studying this module. If students wish to study both EPM202 and EPM304 in the same year, they are recommended to have achieved at least a grade 3 in EPM102.

Epidemiology students may choose to study CTM208 *Further Statistical Methods in Clinical Trials* in place of EPM304, but must apply to the Programme Director for approval, and must not register for and must not study both EPM304 *Advanced Statistical Methods in Epidemiology* and CTM208.

**Clinical Trials students** may choose to study EPM304 in place of CTM208 *Further Statistical Methods in Clinical Trials*, but must **not** register for and must **not** study both CTM208 *Further Statistical Methods in Clinical Trials* and EPM304. Clinical Trials students wishing to study EPM304 must also ensure that they have studied CTM207 *Design and Analysis of Epidemiological Studies* before studying EPM304 or must obtain Programme Director approval before registration. Students can register for both EPM304 and CTM207 in the same year but should first study the material for CTM207 as explained above.

Students studying this module as an individual module must have basic epidemiological knowledge and skills equivalent to EPM101 *Fundamentals of Epidemiology*, EPM102 *Statistics for Epidemiology* [previously entitled *Statistics with Computing*], EPM103 *Practical Epidemiology*, EPM105 *Writing and reviewing epidemiological papers* and EPM202 *Statistical Methods in Epidemiology*. 
Those wishing to study this module **must have regular access to the internet** to access learning resources, participate in module-specific discussions on Moodle, benefit from online library facilities and submit assignments.

### English language requirements
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](#), with an acceptable score in an approved test taken in the two years prior to entry. Applicants may be asked to take a test even if the standard conditions have been met.

### Student numbers
There is no cap on the number of students who can register for this distance learning module. The number of students actively studying this module varies, but typically approx. 120 students register for the module per year.

### Student selection
This module is available to those registered for the DL PG Dip and MSc Epidemiology or Clinical Trials programmes. Alternatively, students may register for this as an “individual module”.

This module is also open to students registered on LSHTM face-to-face (i.e. London-based) MSc programmes (subject to programme-specific limitations) and research degree students.

### Fees
The current schedule of fees can be viewed at [https://london.ac.uk/applications/costs-your-course/course-fees](https://london.ac.uk/applications/costs-your-course/course-fees) (click on the Postgraduate Fees link).

### Scholarships
Scholarships are not available for individual modules. Some potential [sources of funding](#) are detailed on the LSHTM website.

### Admission deadlines
Applications for LSHTM distance learning programmes and modules are managed by the University of London. To apply to take either a formal award (i.e. PG Certificate, PG Diploma or MSc) or an individual module, please see here: [https://london.ac.uk/courses/epidemiology](https://london.ac.uk/courses/epidemiology)

Key deadlines are as follows:
- Application deadline: 31 August (for those taking the module as an individual module).
- Registration deadline: 31 October (continuing students and those taking the module as an individual module).

**Please note:** The academic year starts 1 October. Students who register after 1 October should note that module welcome and Collaborate sessions held in October are recorded, but they cannot request an extension to assignment submission deadlines or apply for an examination extenuating circumstance as a result of registering later than 1 October.

(In-house LSHTM research students can self-enrol on the module’s Moodle area. In-house LSHTM MSc students wishing to study this module should note information given in the mixed mode study option [link](#).)

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**ABOUT THIS DOCUMENT**

This module specification applies for the academic year 2019-20

Last revised/approved 28/2/19, by Sian Floyd

Further revisions revised [Date / Month / Year], by [Name]

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