

# Module Specification



**UNIVERSITY  
OF LONDON**  
INTERNATIONAL  
PROGRAMMES

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE



## GENERAL INFORMATION

<b>Module name</b>	<b>Modelling and the Dynamics of Infectious Diseases</b>
<b>Module code</b>	EPM302
<b>Module Organiser(s)</b>	Rosalind Eggo, Tom Sumner, Kathleen O'Reilly
<b>Contact email</b>	<p>The LSHTM distance learning programmes and modules are run in collaboration with the University of London International Programmes. Enquiries may be made via their Student Advice Centre at: <a href="http://www.londoninternational.ac.uk/contact-us">www.londoninternational.ac.uk/contact-us</a>.</p> <p>(Enquiries from face-to-face i.e. 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>.)</p>
<b>Home Faculty</b>	<p>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></p>
<b>Level</b>	This module is at Level 7 (postgraduate Masters level) of the QAA <a href="#">Framework for Higher Education Qualifications</a> in England, Wales & Northern Ireland (FHEQ).
<b>Credit</b>	LSHTM award 15 credits on successful completion of this module.
<b>Accreditation</b>	Not currently accredited by any other body.
<b>Keywords</b>	Infectious Disease Modelling, [HIV/AIDS, Bacterial, TB, Malaria, Viral Disease prevention & control,] Research methods, Epidemiology, Quantitative methods.

## AIMS, OBJECTIVES AND AUDIENCE

<b>Overall aim</b>	This module aims to introduce you to the mathematical modelling of infectious diseases.
<b>Intended learning outcomes</b>	<p>On completion of this module students should:</p> <ul style="list-style-type: none"> <li>• have obtained key insights into the dynamics of infectious diseases and the effect of control measures that transmission models can provide.</li> <li>• be able to write down difference equation or differential equation models describing the transmission dynamics of an infection and understand the key input parameters that go into models.</li> <li>• be able to devise simple deterministic models and implement them in Excel and Berkeley Madonna</li> <li>• be able to analyse seroprevalence data and use catalytic models to estimate key epidemiological statistics</li> <li>• be able to demonstrate an understanding of the methods and importance of incorporating non-random mixing into models when predicting the impact of control measures</li> <li>• be able to calculate the basic reproduction number, <math>R_0</math>, for different assumptions about contact between individuals</li> <li>• understand the important characteristics of sexually transmitted infections as distinguished from the characteristics of acute immunising infections.</li> </ul>

<b>Target audience</b>	The module aims to bring a conceptual understanding of mathematical models and their applications in infectious disease research to individuals who have not had any advanced training in mathematics. It is also suitable for individuals with a background in mathematical disciplines who wish to obtain an understanding of the broad range of applications of mathematical models in infectious disease epidemiology and who may wish to specialize in this area in the future.
<b>CONTENT</b>	
<b>Session content</b>	<p>Module content is structured around the self-study sessions listed below:</p> <p>MD01 Basic modelling methods I: an introduction to difference equations</p> <p>MD02 Basic modelling methods II: an introduction to differential equations</p> <p>MD03 The natural dynamics of infectious diseases</p> <p>MD04 Applying modelling techniques to analyse seroprevalence data</p> <p>MD05 Modelling the impact of rubella vaccination in high and low transmission settings</p> <p>MD06 Methods for incorporating non-random (heterogeneous) mixing into models</p> <p>MD07 Calculating <math>R_0</math> for non-randomly mixing populations</p> <p>MD08 Modelling HIV and STIs</p>
<b>TEACHING, LEARNING AND ASSESSMENT</b>	
<b>Study resources provided or required</b>	<p>The following materials are provided to students after registration for this module once a year in September/October:</p> <p>CD-Rom - EPM302</p> <p><u>Textbook:</u>  <i>An Introduction to Infectious Disease Modelling</i> (Vynnycky and White)</p> <p><u>Software:</u>  Berkeley Madonna (<b>note this does not work on Apple Mac computers; students should ensure that they have access to a Windows based PC</b>)</p> <p>In addition to the materials above, students are given access to</p> <p>i) the LSHTM Virtual Learning Environment, Moodle, which contains resources such as discussion forums and supplementary programme materials and</p> <p>ii) the LSHTM online library.</p> <p>Students who are taking this as an individual module also have online access to the EPM1 computer-based sessions (this access will exclude tutor support and associated textbooks).</p>
<b>Teaching and learning methods</b>	<p>Learning is self-directed against a detailed set of learning objectives using the materials provided. The key learning methods are:</p> <ul style="list-style-type: none"> <li>• reading and reflecting on CAL (computer-assisted learning) materials which introduce, explain and apply the principles and methods covered in the module</li> <li>• reading and reflecting on paper-based materials which support the learning in the CAL sessions</li> <li>• completing paper and computer-based practical exercises</li> <li>• accessing academic support which is available from the module tutors through the web-based discussion fora and real-time sessions (using Blackboard Collaborate) in which students are encouraged to participate</li> <li>• completing the assessed assignment and reflecting on written feedback from module tutors</li> <li>• completing the formative assignment and reflecting on written feedback from module tutors.</li> </ul>

<b>Assessment details</b>	<p>Formal assessment of this module includes a two-hour unseen written examination with 15 minutes' additional reading/planning time (70%) and an assessed assignment (30%).</p> <p>If students fail the module overall, they are allowed one further attempt at the failed element (examination and/or assignment).</p>
<b>Assessment dates</b>	<p>The assessed assignment for this module can be submitted only once annually, no later than 31 March and must be submitted via the online Assignment Management System.</p> <p>For students who are required to re-sit, the next assessment will be in the following academic year.</p> <p>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 <a href="http://www.londoninternational.ac.uk/community-support-resources/current-students/examinations/examination-centres">www.londoninternational.ac.uk/community-support-resources/current-students/examinations/examination-centres</a>.</p> <p>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 International Programmes nor the LSHTM have any control over the fee amount.</p> <p>For students who are required to re-sit, or granted a deferral or new attempt at the written examination, the next examination date will normally be the following June.</p>
<b>Language of study and assessment</b>	English (please see 'English language requirements' below regarding the standard required for entry).
<b>TIMING AND MODE OF STUDY</b>	
<b>Duration</b>	<p>Students may start their studies at any time from receipt of study materials (dispatched annually usually during September/October, depending on date of registration) and work through the material until the start of the June examinations (although assessment submission deadlines which are earlier than this must be observed).</p> <p>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.</p>
<b>Dates</b>	Tutorial support for distance learning modules is available from the beginning of October through to the examination in June.
<b>Mode of study</b>	By distance learning.
<b>Learning time</b>	<p>The notional learning time for the module totals 150 hours, consisting of:</p> <ul style="list-style-type: none"> <li>• <b>Directed self-study</b> (reading and working through the provided module material) ≈ 70 hours</li> <li>• <b>Self-directed learning</b> (general reading around the subject, library, Moodle discussion fora) ≈ 30 hours</li> <li>• <b>Assessment, review and revision</b> ≈ 50 hours</li> </ul>

APPLICATION, ADMISSION AND FEES	
<b>Pre-requisites</b>	<p>Students wishing to study this module:</p> <ul style="list-style-type: none"> <li>• must have passed EPM101 <i>Fundamentals of Epidemiology</i> and EPM102 <i>Statistics with Computing</i> or have equivalent basic epidemiological knowledge and skills.</li> <li>• are expected to be capable of carrying out basic functions using Excel software.</li> <li>• will need to have access to a <b>Windows based PC</b> that has Microsoft Excel 2007 (or later version) installed, and have a CD-ROM drive to install the modelling software used in the module.</li> <li>• must have regular access to the internet to participate in module-specific discussions on Moodle, benefit from online library facilities and submit assignments.</li> </ul> <p>Clinical Trials students must ensure that they have studied CTM207 <i>Design and Analysis of Epidemiological Studies</i> before studying this module or must obtain Programme Director approval before registration.</p> <p><b>Important: students must have access to a Windows based PC as some of the software used in the module does not work on Apple Mac computers.</b></p>
<b>English language requirements</b>	<p>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 <a href="#">English language requirements</a>, 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.</p>
<b>Student numbers</b>	<p>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. 25 students register for the module per year.</p>
<b>Student selection</b>	<p>This module is available to those registered for the DL PG Diploma and MSc Epidemiology programmes. It is also available to those studying for the DL PG Diploma and MSc Clinical Trials programmes.</p> <p>Alternatively, students may register for this as an “individual module”.</p> <p>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.</p>
<b>Fees</b>	<p>The current schedule of fees can be viewed at <a href="http://www.londoninternational.ac.uk/fees">www.londoninternational.ac.uk/fees</a> (click on the LSHTM programme link).</p>
<b>Scholarships</b>	<p>Scholarships are not available for individual modules. Some potential <a href="#">sources of funding</a> are detailed on the LSHTM website.</p>
<b>Admission deadlines</b>	<p>Applications for LSHTM distance learning programmes and modules are managed by the University of London International Programmes. To apply to take either a formal award (i.e. PG Certificate, PG Diploma or MSc) or an individual module, click the relevant link on the right hand side of the page at <a href="http://www.londoninternational.ac.uk/courses/postgraduate/lshtm/epidemiology-msc-postgraduate-diploma-postgraduate-certificate">http://www.londoninternational.ac.uk/courses/postgraduate/lshtm/epidemiology-msc-postgraduate-diploma-postgraduate-certificate</a>.</p> <p>Key deadlines are as follows:</p> <ul style="list-style-type: none"> <li>➤ Application deadline: 31 August (Note: applicants who submit applications on or after 1 June 2017 will be required to pay an application fee of £100 at the point of submission, which will be deducted from the balance of fees payable upon registration. If the application does not result in registration, the application fee will not be</li> </ul>

*refunded. No application fee will apply to applications submitted on or before 31 May 2017.)*

- Registration deadline: 30 September (new students)
- 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 MSc and research students wishing to study this module should note information given in the mixed mode study option links at <https://lshtm.sharepoint.com/Teaching-and-Support/Pages/taught-programmes-handbooks-regulations-policies.aspx>.)

## ABOUT THIS DOCUMENT

**This module specification applies for the academic year: 2017-18**

**Last revised/approved** 08/02/2017 by Tom Sumner

Further revisions revised 01/08/2017 by Anne Tholen

London School of Hygiene & Tropical Medicine, Keppel St., London WC1E 7HT.

[www.lshtm.ac.uk](http://www.lshtm.ac.uk)