



## MODULE SPECIFICATION

<b>Academic Year (student cohort covered by specification)</b>	2021-22
<b>Module Code</b>	2429
<b>Module Title</b>	Population Dynamics & Projections
<b>Module Organiser(s)</b>	Georges Reniers and Julio Romero Prieto
<b>Faculty</b>	Epidemiology & Population Health
<b>FHEQ Level</b>	Level 7
<b>Credit Value</b>	<b>CATS:</b> 15 <b>ECTS:</b> 7.5
<b>HECoS Code</b>	101408
<b>Term of Delivery</b>	Term 2
<b>Mode of Delivery</b>	For 2021-22 this module is currently planned as a mixture of online and face to face teaching. We will, however, accommodate students who wish to study remote only. Teaching will comprise a combination of live and interactive activities (synchronous learning) as well as pre-recorded lectures and self-directed study (asynchronous learning).
<b>Mode of Study</b>	Full-time
<b>Language of Study</b>	English
<b>Pre-Requisites</b>	GCSE-level mathematics, together with an understanding of natural logs and exponential growth, are needed to follow the mathematical aspects of material introduced in this module. Calculus is not required. An understanding of basic demographic methods, taught in the term 1 Demographic Methods module, is expected. Alternatively, students can fulfil this prerequisite by studying PAPP101 (Introduction to Demographic Analysis), which is freely accessible online: <a href="http://papp.iussp.org/">http://papp.iussp.org/</a>
<b>Accreditation by Professional Statutory and Regulatory Body</b>	None
<b>Module Cap (indicative number of students)</b>	25 (numbers may be capped due to limitations in facilities or staffing)
<b>Target Audience</b>	The module is intended primarily for students on the MSc Demography & Health but is also suitable for others with an interest in mathematical modelling, demographic estimation and population forecasts.

<b>Module Description</b>	This is an advanced demographic methods course introducing students to population dynamics, population models (including the use of these models in the estimation of demographic parameters) and population projections.
<b>Duration</b>	5 weeks at 2.5 days per week
<b>Timetabling slot</b>	Slot D2
<b>Last Revised (e.g. year changes approved)</b>	September 2021

<b>Programme(s)</b> This module is linked to the following programme(s)	<b>Status</b>
MSc Demography & Health	Compulsory

## Module Aim and Intended Learning Outcomes

<b>Overall aim of the module</b>
The overall module aims are to introduce students to <ul style="list-style-type: none"> <li>• the mathematical theory of changes in population size and structure;</li> <li>• the types and uses of demographic models and their application in demographic estimation;</li> <li>• the principles and practicalities involved in making population projections and forecasts.</li> </ul>

<b>Module Intended Learning Outcomes</b>
Upon successful completion of the module a student will be able to: <ol style="list-style-type: none"> <li>1. Define and interpret the main measures of fertility, mortality, migration and age structure</li> <li>2. Describe and assess typical age patterns of fertility, mortality and migration and explain the models commonly used to represent them</li> <li>3. Evaluate and explain the interactions between the components of population change and the age structure of the population</li> <li>4. Explain the concept of population momentum</li> <li>5. Understand tempo distortions in demographic estimation</li> <li>6. Use a computer package (Excel, Stata or R) to perform demographic calculations</li> <li>7. Understand the main approaches used to forecast fertility, mortality and migration</li> <li>8. Construct national-level population projections using a suitable computer package</li> </ol>

## Indicative Syllabus

### Session Content

The module is expected to cover the following topics:

- Exponential growth (revision of basic concepts)
- Population measures of reproductive level and pace
- Stable population theory
- Models of fertility, mortality and migration, including survival time approaches to fertility and migration analysis
- The effects of changes in fertility, mortality and migration on growth, age composition and crude rates
- Population momentum and ageing
- Population projections and forecasts
- Ways of forecasting fertility, mortality and migration
- The concepts of quantum and tempo applied to synthetic cohort measures
- Variable growth rate methods as a generalisation of stable population theory
- Applications of population models to demographic estimation in populations with limited or defective data (a.k.a. indirect estimation techniques)

## Teaching and Learning

### Notional Learning Hours

Type of Learning Time	Number of Hours	Expressed as Percentage (%)
Contact time	45	30
Directed self-study	20	13
Self-directed learning	60	40
Assessment, review and revision	25	17
<b>Total</b>	<b>150</b>	<b>100</b>

Student contact time refers to the tutor-mediated time allocated to teaching, provision of guidance and feedback to students. This time includes activities that take place in face-to-face contexts such as lectures, seminars, demonstrations, tutorials, supervised laboratory workshops, practical classes, project supervision as well as where tutors are available for one-to-one discussions and interaction by email. Student contact time also includes tutor-mediated activities that take place in online environments, which may be synchronous (using real-time digital tools such as Zoom or Blackboard Collaborate Ultra) or asynchronous (using digital tools such as tutor-moderated discussion forums or blogs often delivered through the School's virtual learning environment, Moodle).

The division of notional learning hours listed above is indicative and is designed to inform students as to the relative split between interactive (online or on-campus) and self-directed study.



### **Teaching and Learning Strategy**

The teaching and learning for each of the topics covered in this module revolves around (i) a set of pre-recorded video lectures and background reading materials, (ii) individual or group work on practical applications of the methods discussed in the video lectures, and (iii) live classroom sessions.

The live classroom sessions will be conducted in small groups to facilitate discussion and will not be recorded. The live classroom session will first open the floor for a Q&A on the theory. After a short break the practical solutions will be discussed (where applicable, with a demonstration in a statistical computing package). In the live classroom session we will usually use Excel, but the solutions to the practical exercises will also be provided in both Stata and R. Once a week, we will organise digital office hours with tutors/lecturer to address any specific questions related to the lecture, practical exercises or the implementation of some of the methods in a statistical computing package. ,

### **Assessment**

#### **Assessment Strategy**

The assessment for this module has been designed to measure student learning against the module intended learning outcomes (ILOs) as listed above. The grade for summative assessment(s) only will go towards the overall award GPA.

The assessment will involve producing a report for the non-specialist reader interpreting the changes occurring in an example population using a set of demographic data provided in spreadsheet format. More specifically, students are expected to:

- (i) Prepare a presentation (in PowerPoint or pdf format) with detailed notes discussing the content of the presentation. The Presentation and accompanying notes should not exceed 2500 words.
- (ii) Make a 10-15 min oral presentation (if need be over Zoom) to module organizers and tutor(s)

The total for the assessment will be 100% of the allocated grade (75% for the written document and 25% for the presentation and response to probing questions). All assessments will be marked independently by two markers and reconciled.



## Summative Assessment

Assessment Type	Assessment Length (i.e. Word Count, Length of presentation in minutes)	Weighting (%)	Intended Module Learning Outcomes Tested
Presentation Slides and Notes	2500 words maximum	75	All
Presentation	10-15 minutes including Q&A	25	1-5 & 7

### Resitting assessment

Resits will accord with the LSHTM's [Resits Policy](#).

Resit/deferred/new attempts - The task will be broadly similar to the original assessment but based on a different example population undergoing a different combination of demographic changes. The next assessment deadline will be during mid/late September of the current academic year.

## Resources

### Indicative reading list

A full reading list will be made available through the Moodle module page. A key demographic methods textbook that we often refer to in class is: Preston, S., Heuveline, P., & Guillot, M. (2000). Demography: measuring and modeling population processes. 2001. Malden, MA: Blackwell Publishers.

## Teaching for Disabilities and Learning Differences

The module-specific site on Moodle gives students access to background reading materials, pre-recorded lectures (most with transcripts) . , practical materials and solutions.

LSHTM Moodle is accessible to the widest possible audience, regardless of specific needs or disabilities. More detail can be found in the [Moodle Accessibility Statement](#) which can also be found within the footer of the Moodle pages. All students have access to "SensusAccess" software which allows conversion of files into alternative formats.

Student Support Services can arrange learning or assessment adjustments for students where needed. Details and how to request support can be found on the [LSHTM Disability Support pages](#).